

Transforming Economies

The Case of the Norwegian Electricity Market Reform

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Per Ingvar Olsen:
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Preface

Being educated as a “main stream” economist, this project has been an exploration into areas of contemporary social and economic theories which to me at the outset represented a somewhat foggy world of ideas. It started off with an interest in understanding some peculiar changes in property rights and behaviors within public sector electricity companies in the wake of the market reform. These appeared to take place simply through re-interpretations of what the public company “really was”. So what is a public sector company actually? Why do some of them all of a sudden behave as if they were something else - like private capital owned enterprises? And why is it that their employees engage in “educating” their owners to behave as if they were? What if there had been a completely different reform – would they then have understood the character of their own activity in very different ways and behaved accordingly? How can we explain this type of an economic change process? These early questions brought me into additional questions and to the need for an appropriate analytical framing.

Initially, I thought that the area of evolutionary and neo-institutional economics would probably put me on the right track, and worked extensively on forcing various of its ideas onto my empirical observations. It run into what appeared to me to be a dead end though, as the explanatory modes of the theory pointed in quite unreasonable directions as compared to my observations. I then turned to the area of neo-institutional organization theory for help, which certainly represented a more promising route. But, being an area primarily oriented towards the understanding of organizations, I soon run into the problem that it had little to say about the role of the state in the economy or the role of economics as a scientific discipline in economic change, both of which seemed to be important points of departure.

At Stanford University I was lucky to get introduced to the more recent work of Mark Granovetter and his colleagues on their “social construction of the economy” project, which focused on the “social construction of the American electricity industry” from the perspective of network theory. I then did some extensive journeys into the sociological tradition in economics. An apparent problem however, was the still rather limited roles for states and such a thing as economic science in Granovetter’s theories. This seemed to follow from the strong emphasis on the role of interpersonal networks rather than networks identified by their specific content and meaning. To explore the problem with the state, I investigated further into the tradition of economic sociologists like Katzenstein and Gerschenkron as well as the more recent “Bringing the state back in” comparative institutional tradition

represented for instance by Peter Evans and Theda Skocpol, which carries substantially on a “power of the state” theory provided by Michael Mann. After substantial efforts to apply these theories to my problems, I also felt that I was into much of a dead end. The theory - despite the explicit objective of it – appeared to be unable to “capture” the problem of radical change. The problem seemed to be that the theory started out with basic and stable categories of state institutions and state-civil society relationships. Even though their work provided very interesting empirical stories about state-market change processes, of how they were enforced by actors, technologies, educational institutions and state bureaucrats, etc., the constraints of the structural and static institutional concepts applied seemed to prevent them from developing a theory which reflect the dynamics and the causal forces of state-market transformation processes. – leaving us simply with different institutional structures and capabilities as theoretical building blocks.

Then, at a course in social constructivism at the Copenhagen Business School which I attended with the purpose of exploring further into Granovetter’s approach, I also got introduced to the sociology of science and technology tradition and their actor-network analytical concepts. These, I found, corresponded more closely to what I was in search for; a theory with general and flexible analytical concepts by which to analyze change-making processes driven by program-specific actor-networks of a very general type, rather than by interpersonal networks as advocated by Granovetter. But, the concepts were highly abstract, expressed in the language of philosophy- and sociology of science, and were applied within quite different areas of science than economics and markets. They also in important respects broke away from the paradigmatic concepts within economic thought that I had become aware of. Would it be possible to translate some of these concepts into analysis of economic reforms?

Then, at a conference about institutional economics in early 1998, I came to learn that scientists within the more classical institutional school of economics were working on somewhat similar theoretical approaches. This led to another theoretical journey to discover a bit of a perhaps fragmented area of economic science, but which offered some highly interesting contributions to a dynamic economic theory, which also addressed the role of economics itself in the shaping of economic systems and economic behaviors. In the end, I found important contributions within both new economic sociology and (traditional) institutional economics which provided me with important points of departure from where to align concepts taken from the sociology of science and technology to a theory about market-making activities.

Coming close to an end, I also learn that scientists associated with the science study tradition have recently started expanding their field of science to include economic issues such as markets in ways which resemble quite a few striking similarities with my own work. In his latest book “The Laws of the Market (1999), Michel Callon relates to and builds on work within both new economic sociology and (traditional) institutional economics which in part also are discussed in this thesis. In the uncertain world of academic controversy – in particular related to efforts which break away from well established paradigms, I feel confident to note that my trust in the fertility of an integration between new economic sociology, (traditional) institutional economics and the new area of “economic innovation theory” based on flexible and general analytical concepts, is shared not only by the sociology of science tradition, but apparently also by a few outstanding members of the two economic scientific communities. Finally, I am also pleased to note that this permits me also to return rather safely to the area of main stream economics – on the basis of a different understanding of what this area or science is about.

Even though the many shifting framings and theoretical approaches have been somewhat hazardous from a project management perspective, I feel that it has been truly driven by scientific curiosity and an insistence on testing the capacity of the various approaches to deal with the analytical problems at hand. In retrospect however, one must probably conclude by citing Winston Churchill’s famous statement: “This is not the end. This is not even the beginning of the end. But it might be that this is the end of the beginning”. Potential contributions from areas like sociology of science and technology to economics has probably only been scratched upon by this piece of work.

Acknowledgements

I would like to bring special thanks to my supervisor Atle Midttun at the Norwegian School of Management. I recognize that neither I nor the project have probably been easy to follow and to advice through the many shifting approaches and drafts. No doubt however, your insistence on theoretical clarification, communicability and structure has represented a solid wall of bricks against remaining in a state of foggy thoughts, and has forced me further into finding bright spots in misty landscapes. Similarly, I would like to thank Lars Thue for useful comments which helped me rounding up this project. A deeply felt thank you also to Daniel Bromley who provided very useful comments, suggestions and moral support in one of those situations of despair when you feel that nobody is able to understand what on earth you

are trying to get at – not even yourself, and to Håkan Håkansson for comments and valuable pieces of advice.

Special thanks also goes to Ole Jess Olesen, Peter Fristrup and Jens Leth Hougaard who provided useful comments and support at an early stage, and to James G. March and Johan P. Olsen who offered me the opportunity to stay 6 months at the Scancor institution at Stanford University and to participate among other things in Jim's weekly seminars, where he and fellow visiting scholars provided very useful comments on early ideas and drafts. Many thanks also to Mark Granovetter for inspiration and for letting me participate in his interesting lecturing in economic sociology at Stanford.

The major contributors however, have been the many informants from within the sector – like managers in various electricity companies – and participants in the change processes by which this thesis is concerned, who have given of their time for interviews and comments to early drafts.

Many others have also been of great help – either directly by commenting my work or by providing me with the economic opportunities to carry through this privileged type of work, or indirectly through their interest and moral support. My colleague Lars Thue and historian Bjørn Barth Jacobsen have both provided thoughtful and inspiring comments and a rich analytical material in their own historical work regarding the electricity market reform, from where I have extracted valuable contributions to my own analytical project. Their contributions will also become evident to the reader as he discovers the many references to their work through out my historical analysis. Fellow doctoral students and teachers at doctoral courses and seminars also deserve mentioning. Not even a full list of contributors could however have absolved me from the responsibility for any part of the manuscript.

On the economic side, the Norwegian Research Council and the Norwegian School of Management should be thanked for providing each one half of the grants needed and for offering additional support for my visit to Stanford University. And my institute at NSM is hereby thanked for taking so much care of me while completing the work.

I would also like to thank members of my NFR project committee and those participants in the electricity industry and the market reform process who gave of their time to offer me information and to correct some of my misunderstandings. Much of it I have used, some I have resisted, but much is still stored for later work.

Finally, Elisabeth and Morten - and Eilef who came to earth in the middle of this project, should be thanked for providing the relieves and the joys of life needed to remain truly and very much alive during this messy paperwork. I hope I have not disturbed you too much by bringing the shadows of academic life too far into family life.

Oslo, juni 2000
Per Ingvar Olsen

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Summary

The topic of this thesis is the shaping of modern economies, represented by a case-study of the Norwegian electricity market reform process. The essential questions raised are: “Why are industries and economies organized the way they are?” and “Why and how do they occasionally experience fairly radical transformations during which we come to see their organizational structures and associated behaviors in entirely different ways?” To answer these questions, the author has followed a radical “market-making” economic reform process through its many projects, processes and rivalries, from its roots in specific historical controversies through its major breakthrough and into a stabilized new economic system.

A major argument through out the analysis is that economics as a scientific activity and -community plays a particularly important role in the re-shaping of economic systems. Large scale economic reforms are found to be dependent upon scientific and political powers and legitimacy which results from broad consensus within the relevant scientific communities. In order to make his point, the author presents and discusses various historical economic reform initiatives both within the Norwegian electricity sector, within other sectors of the economy and in other countries. He also presents elements of a broad process of reorientation within economics during the 1970s and follows these new conceptions up to the electricity market reform process in the late 1980s.

The analysis tries to explain why Norway became a hotbed for market reform of the technically integrated and institutionally complex and locked-in electricity system, but also tries to extract medium range insights about economic reform processes and to discuss more general implications for other large scale economic reform projects as well as for economic theories about economic change - through a rethinking of some of the basics in economic thought.

The thesis is separated into four parts. The first part discusses the theoretical, analytical and methodological approach, which mainly draws from contributions within Sociology of Science and Technology (the Actor-Network approach) and from Economic Sociology (social network theory). Other lines of thought are also touched upon, like different traditions within institutional theory and institutional economics. Even though issues within main stream economics are also discussed in brief, this scientific tradition here mainly serves as an empirical area of investigation.

The second part of the thesis presents the historical background of the Norwegian electricity sector in broad – drawing lines back to the early establishing of the Norwegian electricity system and passing through important formative processes and reform attempts which came to establish vital directions and constraints on the later market reform.

In part three, the emergence of the market reform is triangulated through analysis with distinctly different focuses. One concentrates on the immediate controversies and rival reform programs within the sector in between 1965 and 1985. Another takes its departure from the reorientation among leading economists internationally in the late 1960s and early 1970s, and follows their new economic concepts, models and arguments back to Norway, through various economic and public sector reforms in between 1977 and 1986. The third perspective is obtained from a focus on the SAF research institution in Bergen, where the market reform program gradually got established through the carrying out of various research projects regarding the functioning of the electricity system. Finally, there is a focussed discussion of the various attempts at modernizing the Norwegian state administration and the role of the state in the economy during the second half of the 1980s, by shifting governments and in particular by actors within the state administration with the responsibility to help shaping and carrying out these political-economic ambitions. The linking together of these processes is demonstrated to represent the crossroad where the electricity market reform got mobilized as a political and economic reform initiative.

The fourth and final part analyses the market reform process itself, with a focus on the research projects and reports conducted by the SAF research institution, and on some of the discussions within the economics community regarding the market reform approach. It also analyses the content of the reform and the strategic relationship between the reform program and rival reform programs at the time. From there, the actual political breakthrough for the market reform process is presented and discussed, before the author goes on to discuss the actual process of expansion and stabilization of the reform program through a flow of regulatory initiatives and scientific constructions in the aftermath of the new legislation.

Finally, there is a summary which also discusses the major empirical and theoretical findings.

Transforming Economies

1 Introduction and outline of study

The point of departure for this piece of work is the question: Why are industries and economies organized the way they are? And secondly: Why and how do they occasionally experience fairly radical transformations during which we come to see the rationality of their organizational structures and associated behaviors in entirely different ways? What we tend to see as rational, natural and as quite simply a self-evident order of things, apparently varies substantially both across cultures and over time. When looking back at the many examples of radical economic reforms in the 1980s and -90s typically depicted by words such as "de-regulation", "market reform" or "globalization", it becomes apparent that these many changes are interrelated in some way which has to do with why and how they take on some specific dominant form rather than some other.

Different types of answers and explanations about such changes come from different corners of the social sciences as well as through media, politicians, experts of various types or from wide-spread commonsensical reason among practitioners in the various industries affected. For instance, the explanation about a radical reform process may take either of the two extreme positions that the given change was inevitable, or that it was an outcome of chance events – of pure luck. The latter position indicates that if events somehow had been slightly different at some crucial point during the change process, the outcome would have been all together very different. The first type of argument, may either result from a conception of economic and industrial shape and change as being determined by "economic laws", "choices by completely rational economic man", "the survival of the most efficient industrial form" or other underlying inherent characteristics of nature, society or the economy. It may also result from assumed inherent features of new or changed technologies like information and communication technologies, or it may be said to result from specific historical circumstances and events which is said to have caused the later outcome in some deterministic sense.

Even though determinism - or mechanical and structural-functional types of arguments - within the social sciences are increasingly being rejected across fields of research which involves also human volition in action¹, it can hardly be denied that given shapes of economies and industries, institutions,

¹ See for instance the argument of Daniel Bromley about mechanical and final cause arguments (1998), Thorstein Veblen's critique of classical economics (1898) and Mark Granovetter's discussion of functionalism in economic theorizing (1985).

new technologies and historical circumstances and events are still important to viable explanations. Neither can it be rejected that such a thing as an accidental event may severely alter the outcome of a change process, even though one may obviously hold that such an event alone would by far be a sufficient account of the constitution of the outcome. The theoretical problem central to efforts in more recent studies of industrial and economic shape and change, has been to identify the adequate framing of the explanatory approach, while rejecting conjectures associated with whatever is the more rational, the more functional or natural, or the self-evident order and character of things.

A number of these efforts may – despite dissimilarities - be grouped into an emerging area of science we may denote sociology of industries and economies². These are all concerned with explaining why and how specific industries and economies obtain their shape and why and how they may radically change. In broad terms, the various approaches seem to share the basic understanding *that industries and economies are embedded in social systems, in political systems, in legislation, in technologies, in scientific activities and in culture* in the very broad sense, which will have to be accounted for in appropriate ways. For instance contributions within economic sociology explain how massive shifts towards corporate diversification in the US resulted from efforts to expand companies under conditions of tight anti-trust legislation. Alfred Chandler's argument about the assumed "superior efficiency of the M-form" as an explanation for this wide spread practice and apparent success, thereby became re-addressed and handed over to the interaction of industries with politics and the legislative system – to the processes and controversies during which the M-form shape became produced³. Others emphasize the importance of social (interpersonal) networks in the shaping of industries⁴. The more general view that there are many different types of embeddedness which somehow have to be dealt with on a non-discriminate basis, is represented for instance by S. Zukin and P. DiMaggio (1990), by Viviana A. Zelizer (1988) and by

² The concept of "sociology of industries and economies", refers to Mark Granovetter's outline of a research program for economic sociology (1990)

³ For a discussion of the argument, see Robert Freeland, 1996

⁴ See for instance Mark Granovetter (1985), Patrick McGuire, Mark Granovetter and Michael Schwartz (1993), Thomas Hughes (1983) and John L Campbell, J. Rogers Hollingsworth and Leon N. Lindberg (1991)

Neil Fligstein (1993)⁵. Institutionalists within studies of organizations and industrial fields emphasize both the coercive, the normative and the (collective) cognitive sources of their structuring and their perceived rationality⁶. The tradition has been particularly concerned with the adaptation of new organizational forms, and more recently with broad waves of industrial and economic change analyzed by concepts such as “translation” and “fashion”⁷. There is also an extensive literature on the role of intra-organizational relationships in the development of and the configuration of industries⁸.

The ambition of this study is to participate in and to contribute to these renewed efforts at investigating into why and how industries and economies obtain their particular shape and change the way they do, but by following a somewhat different approach than those indicated above. While sharing many of their viewpoints and their criticism of more traditional approaches, the ambition here is also to incorporate the very explanation- and rationality-making activity into the empirical field which is to be investigated - on the ground that rationalizations, explanations and framing constitute important elements of the actual shaping and change-making of industries and economies. That is, concepts and explanations about how and why something ought to be shaped or changed in particular ways cannot be treated as merely a separated academic exercise. Rather, it is part of industries and economies in their established forms as well as of their re-making into new forms. To capture this phenomenon, the study draws primarily on analytical concepts and research strategies developed within sociology (anthropology) of science and technology⁹, which is commonly denoted the “actor-network approach”. The tradition is largely associated with three of its founders; Bruno Latour, Michel Callon and John Law¹⁰. There are several other reasons for this choice of approach as well:

⁵ A particularly interesting and influential analysis is found in Neil Fligstein’s “The Transformation of Corporate Control” 1993

⁶ See for instance Richard W. Scott (1995)

⁷ A good example is Barbara Czarniawska and Guje Sevón (1996)

⁸ For an outline of the approach, see Bjørn Axelsson and Geoffrey Easton (1992)

⁹ Concepts will be presented in chapter 2.

¹⁰ See for instance M. Callon & B. Latour, 1981, M. Callon & J. Law, 1997, B. Latour, 1987, 1991, 1992, 1993, 1994

First, because their methodological approach surpasses the problem of agency versus structure as well as the problem of individual intentionality versus collective institutions (norms, rules, etc.) as the categories which make up the alternative primitives of the story one can tell, which has caused so much controversy within the social sciences – seemingly without having reached conclusive results¹¹. Rather, what the actor-network approach obtains, are basic categories of stories about innovations and making of society projects, which starts out from the activity of concept-making, framing, networking, configuration and persuasion related to some purpose, vision or scenario of the future. One thereby avoids taking anything for given in an a-historical sense, and may reduce the analytical approach to the construction of analytical devices of a minimalist and general type which may be flexibly used for empirical inquiries into the actual sense-making, shaping and change-making of industries and economies - into the making of society *in the making*¹². To describe those entities - or basic categories - that are engaged in these activities, I will use the concept of an *entrepreneurial collective*, emphasizing the innovative character of such activities as well as the understanding of the acting entities as extending beyond what can reasonably be described by reference to certain individuals alone¹³.

Second, another advantage of the actor-network methodology and research strategy is that it provides both useful framing and analytical tools to investigate into the making of irrefutable structures, inevitable changes and perceived natural, rational or efficiency superior structures and practices. By clearly separating the change-making from the outcome, it extends the methodological capacity to "operate" the change-making and stabilizing phenomenon by the researcher as compared to rival approaches that I am aware of. It focuses the phenomenon of stabilization of "new systems" through their linkages to whatever has been attached to them in order to support their existence and their shape. Hence, to explain a particular stable outcome necessitates an account of how it came into being, of how various heterogeneous stabilizing elements became shaped and put into place so as to make the new order became inevitable, rational, natural, efficient, true or the like. The approach also adhere to the symmetry-principle initially put forward by David Bloor (1976), which demands that successes and failures,

¹¹ See for instance discussion by Giovanni Dosi (1995)

¹² For an elaborated discussion of this point, see Bruno Latour (1999)

¹³ The concept of an entrepreneurial collective is shaped on the basis of actor-network concepts, and may be seen as a synonym for specific categories av actor-networks.

efficient and in-efficient arrangements, true and false statements etc. be explained by the same causes. When explaining why something became a success, we also should be able to explain by the same type of concepts and arguments, why something else which was also in the making, did not become a stabilized success.

The third rationale for applying the actor-network approach, is that it offers attractive tools to investigate into the de-locking of whatever has become locked-in¹⁴. Whatever arguments for the existence of lock-ins and path dependencies applied – ranging from the economic increasing returns argument to holistic accounts and power arguments, a pressing theoretical challenge is to explain in the presence of path dependencies, how rapid de-locking and revolutionary change may occur. From the actor-network perspective, de-locking can be re-interpreted as a de-stabilizing activity by means of breaking apart the stabilizing capability of elements which hold locked-in phenomena in place. The outcome of a making of an industry- or an economy process, is accordingly just as much about destabilization of rival stabilized or “in the making” systems, as it is about stabilizing a particular alternative.

These are the major reasons for my choice of research strategy and methodology for the study of an instance of radical industrial and economic change. The case under investigation is the Norwegian electricity market reform formally established through a new legislation in 1990. Traditionally, the actor-network approach has focussed much of its attention on the role of technology in industrial transformations. While there are certainly important aspects of the electricity market reform which deserves a careful investigation into new technologies prevailing in the industry, the main focus of attention is rather attracted by a specific area of science, namely what is commonly referred to as “main stream economics”. A striking observation in the aftermath of the market reform, is that economic agencies and economic man as these are described in economic theory with reference to analytical assumptions about rational economic structures and behaviors, appear to have emerged as real life phenomena. Where economists had previously typically criticized the sector for its “irrational” organizations, structures and economic behaviors, new structures and behaviors are largely being approved by economists. Also the identification of a major

¹⁴ The typical references to lock-ins and path dependency are Paul A. David (1986), Brian W. Arthur (1989) and Paul A. David and J. Bunn (1987), but the concepts of lock-ins and path dependency in more or less different implicit forms, are widely spread in many of the research traditions mentioned above. See also Dosi (1995) for a discussion of the problem of de-locking.

entrepreneurial collective engaged in the making of the market reform with a particular economic research institution, calls into focus the role of main stream economics as both a scientific activity, a scientific community and an area of knowledge, in the shaping of industries and economies. The possibly most interesting contribution of this study to a sociology of industries and economies, may therefore be associated with a branch of it which we may call "sociology of economics". This area of investigation appears to be vastly underinvestigated. An interesting contribution has recently been presented by Michel Callon (1998), where he offers an analysis of the role of economics in shaping calculative economic behaviors and the role of conceptual framing in conjunction with economic technologies in solving the essential problem of radical uncertainty facing economic decision-makers.

1.1 *Perspectives on the Norwegian electricity market reform*

The case itself offers a number of additional points of departure for this study, which has to do with the broader transformation of the electricity industry and the economy towards "de-regulation", "competitive markets" and "globalization", in which we may see the electricity market reform as a specific representation. This offers the opportunity to extract insights from the study that are possibly relevant to industrial and economic "change-makers" involved in industrial and economic change projects. Hopefully being equipped with a toolbox of useful analytical concepts, my research strategy is to apply them to my empirical investigation in order to describe and link sequences of events and networks of actors in such a way as to be able to extract such insights in the form of middle range theories about transformations of economic systems in modern societies. Even though relatively modest, there is accordingly also an instrumentalist ambition attached to the study.

In June 1990 the Norwegian parliament approved a new energy law which came to represent the breakthrough for a radical change process in which what had been commonly perceived of as a corporate, mixed hierarchical and cooperative public electricity sector became turned into a competitive market system. The new law was implemented from January 1st 1991. For decades we had seen the electricity sector as a technically integrated natural monopoly, a public sector not-for-profit infrastructure system for the supply of a basic low priced welfare good to the population, to businesses, and especially the supply of cheap input to large scale energy intensive industries. All of a sudden, it became something different. Its very identity apparently changed.

The new legislation was followed by a multiplicity of rapid changes within the sector in terms of new regulatory systems, rapid expansion of organized trade in standardized electricity contracts, restructuring of electricity companies as well as of industrial structures, redistribution of governance roles, reinterpretations of property rights, new types of actors, expansion of international electricity trade etc. To those familiar with the apparent rigidities of the sector during its previous history, the unwillingness to change experienced by those who had been working hard to restructure the fragmented sector for more than 30 years, those who had been engaged in overturning the deadlocks forced by the power intensive industries on the issues of electricity pricing practices and energy exports; to all of those, changes were stunning – a complete and unexpected revolution. Despite incidents of severe real-life tests, the new system appears to be stable and in part enthusiastically embraced by many practitioners both among regulators and market actors.

During 1995/1996, Finland and Sweden also deregulated their electricity markets – largely in line with the Norwegian model – and joined the Norwegian Power Pool system. Since then, we talk about a Nordic model for electricity market deregulation rather than a Norwegian one; the world's first transnational open competitive market for electricity trade. Through cables to Denmark and Poland, these countries are also trading in this market, and with planned cables to Germany and the Netherlands, more and also larger national electricity systems are being connected. From its immediate origins in the 1990 Norwegian electricity reform, we are seemingly watching a stepwise unification and transformation of national electricity systems in a movement from the north towards central Europe.

The Nordic model seems to have become rather popular by transnational policy institutions like the OECD and the European Commission as a both normative and pragmatic alternative to the British electricity market reform which was carried out in 1989 by the Thatcher government. The British and the Norwegian reform concepts were indeed very different. From a quick gaze, major differences can be traced back for instance to their very different starting points in the British nationalized system and the Norwegian fairly fragmented corporate system, to the different energy resource bases in the two systems and to the differences of the political regimes under which they came to remake their systems. The most eye-catching difference in reform approach was between the privatization or state sell-out approach of the British reform as opposed to the complete absence of privatization but more rapid and perhaps also more complete transformation to competitive market trade in the Norwegian case (Midttun, et al., 1997, Midttun & Thomas, 1998).

The EU Commission in the wake of the British and the Norwegian reforms pushed hard to achieve electricity market deregulation of the entire EU electricity sector, and presented several directives about third party access, common carrier principles and transparency of national tariffs etc. These initiatives met substantial opposition from France, but also from other nations and their electricity industries, and the controversy ended in a EU compromise in 1995 which opened for a restricted transnational trade between generators and large scale consumers. Initiatives for further electricity market deregulation thereby shifted to individual member states. Following Sweden and Finland, initiatives have been taken lately by both the Danes¹⁵, the Dutch and the Spanish on the issue of general reforms. Various initiatives have also been taken in Germany. With the new social democratic/green federal government, uncertainty over where to go appears to be considerable, but through the introduction of trade exchanges and a stepwise increase in electricity trade across traditional supply monopolies, a market system also appears to be on its way in Germany. The result of all this has been that the EU process has regained momentum and that the directives presented by the EU Commission in the late 1980s and early 1990s are about to reach a general breakthrough.

A critical problem to national policy makers has to do with the issue of privatization. In Britain, privatization became possible because all relevant property rights were in the hands of the government. In countries like Germany, Denmark and the Netherlands, this is not the case. Property rights are divided within cooperative systems that are either autonomous or in the hands of lower level governments, or they are mixed in complex institutional arrangements. A privatization approach by the state accordingly involves a much more challenging task than just selling out ones own property. One has to force a sale of properties hold by others. Under the rule of the various constitutions, this is both cumbersome and politically risky, as it would directly confront the historically established power systems within the sector, the distribution of governance rights and financial returns.

Under these circumstances, attempts at constructing national electricity sector reforms on the basis of the British model, have mostly approached a dead end. The attention of economists and policy-makers has then moved towards the Nordic model, and as a consequence, many of the large electricity generators in Europe have established subsidiaries in Norway and Sweden to participate in the market and thereby gain experience and knowledge about the Nordic market system. Even the British are planning to

¹⁵ Jutland and Fyn joined the Nordic Power Pool from Juli 1st 1999.

adjust their trading system in the direction of the Nordic model. European electricity market deregulation seems to have entered a more pragmatic stage which suggests an incremental process where national electricity systems are being attached to the Nordic competitive market, where additional similar national trading institutions are created, where practitioners gain some experience and familiarity over time and where scientists, politicians and bureaucrats develop modes of deregulation which adjusts the specifics of their national historical systems to the theoretical concepts of competitive markets. This is not to say that privatization is unlikely to return to the agenda – only that the established power structures will demand that the creation of markets and market agencies comes first.

By representing an important element in this larger European process in terms of being its perhaps most important hotbed and possibly its most complete real life representation so far, the Norwegian electricity market reform becomes an interesting object of study. Recognizing the importance of early events, the Norwegian model is likely to exhibit something which is likely to substantially influence the emerging integrated electricity market system in at least the northern half of Europe. This might be called a European perspective or rationale for this study; to shed some light on the roots of and the preconditions for this apparently incremental European process, and to investigate those elements which were created to force the process as well as to shape a new competitive market system.

A second rationale for investigating into the Norwegian market reform, is more of a Norwegian perspective. After the wave of market reorientation and “neo-liberal” economic revolutions across the world in the 1980’s and 1990’s, many sectors of the economy and of public administration have been changed – also in Norway. But the only case in which a Norwegian initiative seems to have created something which has propelled or substantially influenced large scale economic reforms in other countries, is the electricity market reform. In all other cases, large scale sector reforms in Norway appear to have been inspired from or “forced upon us” from abroad, where we might say that our actions have been responsive and also creative from time to time, but where our contributions are perhaps not too relevant to a larger audience. The Norwegian electricity market reform experiences however, are demanded from abroad. Not only from EU countries, but also from other continents, from Japan to Brazil and from institutions like the World Bank which is searching for possible new models for third world countries to take over from their previous advocacy for large scale vertically integrated systems. And we are setting out to advice people on these matters – being highly confident in the applicability of our model and our successful experiences. Looking back, it even appears to many of us to be the only rational way to organize an electricity system – an impression which

illustrates our tendency to fall into the retrospective fallacy that the actual outcome of our own latest change process represents the most obvious, the most likely and the most modern and rational alternative there is - which suggests that others would be better off if they did the same things, disregarding the character of their historically established systems.

I find that such links are not at all trivial – an insight which for instance can be extracted from the entire history of the Norwegian electricity system and its fairly “stubborn” objections to being transformed by strong normative models coming from other countries where they might have fitted very well. Yes, even the success of the market reform itself can perhaps be traced back to resistance towards taking anybody else’s strong advice¹⁶. To give advice is accordingly neither simple nor necessarily rewarding, and it certainly requires a sufficient amount of humbleness. For a start, we should be careful and serious about understanding our own system and our own reform process properly, including its deep indebtedness to ideas and experiences, movements and events that are truly international, without which any Norwegian market reform would hardly have been thought of. We have to understand the specific historical pre-conditions for our own reform and the specific roles of those actors and those institutions which created and formatted its content and regulatory approach. Not to stop pouring out our pieces of advice to others, but in order to understand the complexity of their challenges and the vital importance of the specifics of history for the prospects of such reforms.

A third and final rationale for this kind of a study has to do with a general phenomenon which we might address as “the making of new competitive market systems”. Many such reforms have been carried out in various parts of the world. Some have been successes and others have not. At least some of the actual outcomes have provided negative surprises to their advocates and system designers, not at least in former Soviet Union and in parts of Eastern Europe. Many a grand plan has fallen apart, is found in ruin or has been taken control of by actors who have turned them into something of a very different character. Radical institutional reforms across the world which aimed at turning hierarchical or massively state regulated systems into well-functioning, efficient and stable competitive market systems, have proven both difficult and extremely complex with apparently unexpected and often unwanted outcomes. This should force us to raise questions and to investigate deeply into these “messy” processes of change, to understand their shaping and complex mediations, and to search out possible conditions

¹⁶ Various approaches and their controversies are discussed in chapter 7.

for successful radical institutional changes. To see what is involved in the management of large innovative economic system reform projects.

1.2 Research approach and research questions

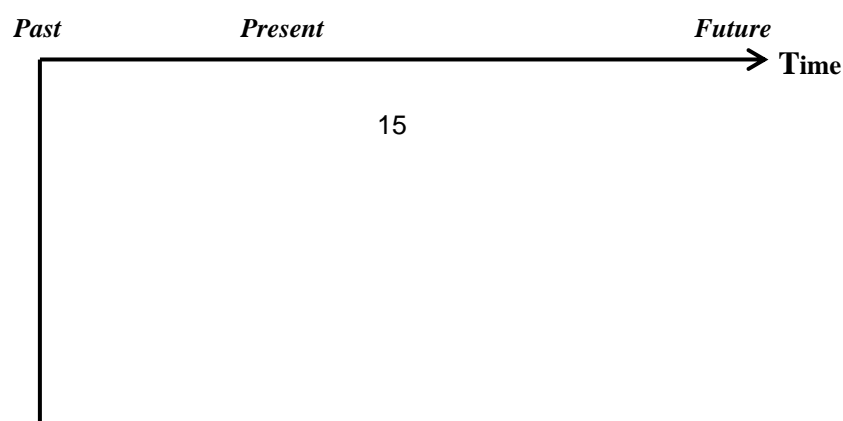
The primary ambition of this work is to construct medium range theories about industrial and economic change and about stabilization and lock-in of new industrial and economic shapes and orders, from the application of the actor-network approach to a single case study.

Essentially based on the actor-network methodology, the research approach will be to investigate into the making of the new market system by following entrepreneurial collectives associated with the electricity sector through their controversies, rivalries and projects in order to obtain an account of why and how the change came about. Given the existence of an ordered historical system, one could indeed ask: Why make a market system where it apparently does not fit into the prevailing order of things? How come someone got the idea, got it through and actually made it work? And, how was it possible to radically change a sector of the economy which could be characterized as institutionally as well as technologically locked-in and stable? Is it possible to extract elements to a *process of change theory* from the Norwegian electricity reform case which hold both explanatory and instrumental value?

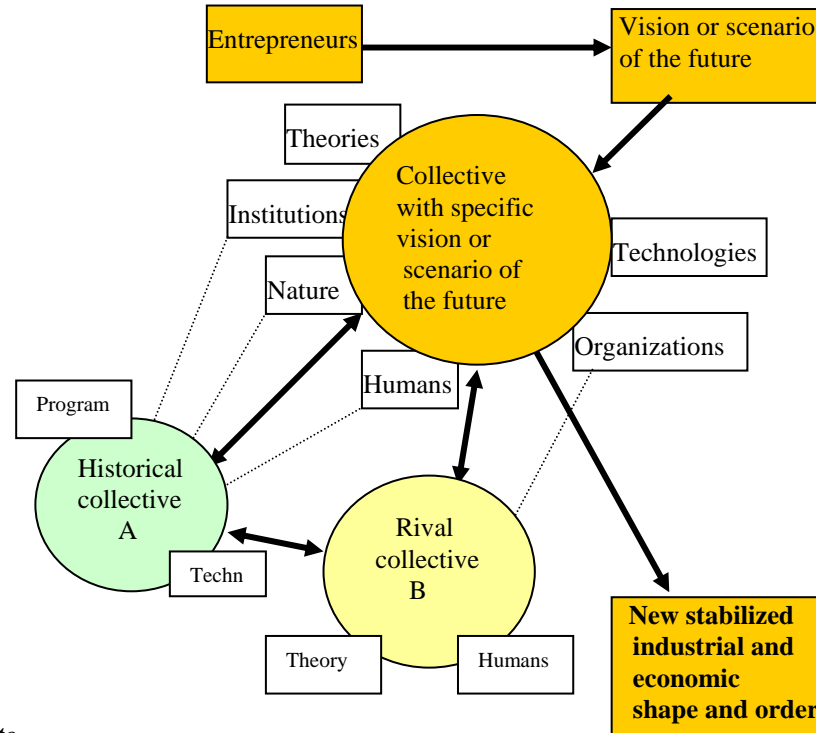
The approach implies to investigate into the controversies within or associated with the sector as well as the framing-, concept-making- and networking activities from where “the market reform entrepreneurial collectives” emerged. Which where these controversies? What were the characteristics of the approaches and the concepts of understanding which had governed the shaping of the prevailing order of the electricity sector, and which alternatives where mobilizing for change at the time? These questions implies to investigate into the content of the reform approach, into its controversies with existing practices and the content of rival approaches.

Next, there is a need to study what went into the making of the new system. Which projects where launched to support it, to expand it, to persuade opponents, to create alliances or to turn it into reality? Figure 1.1 below illustrates the phenomenon under investigation:

Figure 1.1. Model of research approach



Vision



Pathway to realization

Single arrows indicate sequence of events. Double arrows indicate controversy/ rivalry between collectives with different visions/scenarios of the future. Dotted lines indicate that some element may play different roles in rival collectives.

The entrepreneurial collective at the heart of our story is one which is centered around economics as a scientific discipline. I will accordingly use the Norwegian electricity reform case to investigate further into what Michel Callon has denoted “the embeddedness of modern market economies in economics” (Callon, 1998). The core idea is that economics as a scientific discipline in a broad sense plays a particularly important causal and formative role in the making of new market economies by re-framing and re-performing established economies, industries, organizations and behaviors. On the basis of conceptual re-framing and theorizing, it is found to engage in shaping new trade systems, developing new regulation and control systems, re-configuring industrial and organizational structures and transforming economic agencies and agents. Through large scale reform projects guided by economic programs that are in essence derived from developments within economic theory, we apparently witness industries, economies as well as economic behaviors being re-shaped to the extent that the emerging

economy can be said to be embedded in economics itself. How can this capacity be explained, and why is it that once stabilized, the new economic system seems to exert such a powerful influence on even those who would rather see it abolished?

While developments within economics may be found to constitute a major source behind the powerful transformation of industries and economies during the last couple of decades, the success of individual transformation projects guided by such developments appears by no means inevitable. My thesis is that such projects are basically constructed attempts at overthrowing locked in trajectories based on specific historical, technological and political/ideological logic, and do not represent the fulfillment of a pre-given objective “drive towards economic efficiency optimality”, as argued by evolutionary and neo-institutional economic theory. Neither does it follow from any other development implicitly pre-given in the order of things. These projects are essentially open ended and innovative, tied onto local initiatives and circumstances where they might break down for a great number of reasons or break off into different directions – despite their possibly superior efficiency characteristics in theory. A successful stabilization of a new market system, accordingly follows as the outcome of the market-making activities shaped and performed by those engaged - if they succeed in providing and maintaining such a stabilization. Important “points of entrance” and mediators of both change and stabilization in between economics and industries, economies and behaviors, seem to be such things as state economic regulators, economic regulation and control models, accounting systems and economic ideologies or paradigms.

A crucial question which emerge from this reasoning is: What then, may be said to be the role of *economic efficiency* in the making of new economic systems, if economic efficiency in itself cannot explain the outcome?

A possible successful breakthrough for and stabilization of a new economic system seems to be dependent on complex social processes guided by unique applications of economic theory to the specifics of the historical, technical and economic system at hand. This change-making activity contains such things as concept formation, strategy formation, construction of-, association with- and mobilization of power, capturing and re-formatting of major commanding heights, and complex mediations with political and industrial actors. A stabilization of the new system also appears to be dependent on the availability of a large number of “delegates” on whom the expansion out of

the local constraints of the reform initiators can be based, and on appropriate political strategy and project-managerial skills¹⁷.

Through a complex molding of a historical economic system by economists and economic theory, a new economic system might eventually be shaped which is both formatted in accordance with core principles, techniques and measurement technologies in modern economics and unique in its actual configuration of major conceptual components.

The analytical focus on economics demands that economics will be treated as an empirical and historical phenomenon in this inquiry. What I will present, is a sequence of industrial transformation in which important elements of the history of related economic thought will be aligned with a specific historical change process. Traditionally, these two issues have been presented as separated histories; a history of economic thought which is structured according to its own internal conceptual logic, and another history of the political economy in concrete descriptive terms. It is my position that combining the two offers quite a few lessons to be learned. For a start, it will demonstrate that economic theory has also played an important role in shaping non-market organized electricity systems. Economists have not always been engaged in the making of markets, but also for instance in the making of cooperative structures, state hierarchies and comprehensive state regulatory economic systems. We may therefor talk about rival historical economics-networks which have been engaged in shaping economic systems in accordance with quite different core concepts.

1.3 Outline of study

A difficult consideration through out this work has been to identify the appropriate point of entrance into the actual emergence of the market reform. “Everything” seems to be having relevant deeper roots in history, and particular change process and stabilized outcomes way back in history have turned out to play crucial roles in the later change process. In order to capture at least some of the most relevant of these stabilized outcomes, I have included a somewhat extended presentation of the historical background. The point of entrance into the making of a market reform has been set in the late 1960’s, with the introduction of scientific electricity economics to Norway, with the establishing of an internal market for electricity among generators which followed in 1971, and the controversy

¹⁷ A further elaboration of analytical concepts will be presented in chapter 2.

which emerged over pricing- and investment principles within the sector among leading economists and system design engineers.

The study is organized into four major parts; (1) Research strategy and methodology, (2) Historical trajectories and rivalries, (3) Pathways to the electricity market reform and (4) Transforming the electricity industry.

Part 1: Research strategy and methodology

The first part prepares for the empirical study. Chapter 2 presents and discusses core analytical concepts within the actor-network methodology, and also relates the approach to concepts within economic sociology and (traditional) institutional economics. The presentation focuses on the concepts of entrepreneurial collectives and actor-networks, on the concept of power, the concept of expansion of collectives by means of enrollment, translation or transformation of elements of their environments, the concept of controversy and rivalry between collectives and the concept of stability.

Chapter 3 takes the first steps into investigating the historical making of the electricity sector, while at the same time exemplifies and elaborates over the research strategy and the methodology. This occurs through a brief presentation and discussion of a piece of work presented by Patrick McGuire, Mark Granovetter and Michel Schwartz about “Thomas Edison and the social construction of the early American electricity industry” (1993).

Chapter 4 discusses operational research strategy, methods and problems of validity and reliability.

Part 2: Historical trajectories, controversies and rivalries

In part 2, I will present an overview of important historical trajectories and rivalries within and associated with the Norwegian electricity sector in between the 1870s and 1980-85. The purpose is to generate a background picture for the analysis of the later market reform and to present one of my major perspectives in an analytical triangulation of the market reform; the history of the industry and the history of associated economic ideas. The purpose is furthermore to investigate into what may have contributed to or provided the opportunity for a radical market reform collective to emerge and to succeed at the later stage. Is it possible to trace important roots of the electricity market reform in early historical events – or in the early structural, institutional or economic systems which through history came to constitute the Norwegian electricity sector in unique ways?

The historical overview accordingly focuses on major historical collectives which established themselves in powerful positions within the Norwegian electricity sector, which have shaped the industry and its institutional systems up to the market reform. I follow these through their stabilization processes, rivalries, partial de-stabilization and through initiatives to regain formative influences.

Part 3: Pathways to the electricity market reform

Part 3 represents a major part of my empirical analysis of roots of and the pathways of the market reform process. The analysis covers chapter 7 through 10, each providing a specific perspective on the emergence of an electricity market reform program associated with what I have called an entrepreneurial collective. I start out with a focus on the internal rivalry within the electricity sector between entrepreneurial collectives who represented different ideas about and different framing of how a more efficient electricity system could be achieved. It focuses in particular on a collective of actors, institutions, theories and governance technologies associated with professor in hydroelectric engineering Vidkunn Hveding, who from his familiarity with electricity economics internationally in the late 1960s and from his position as director general of the NVE¹⁸ between 1968 and 1975, played a major role in introducing an economic reform program based on scientific electricity economics to Norway which was shaped by superior principles of electricity system design. This, among other things, led to efforts to integrate the Norwegian hydro-power system with thermal power systems in Sweden and Denmark and to the creation of an internal

¹⁸ Norges vassdrags- og elektrisitetsverk

competitive market for “occasional power” exclusively for electricity generators.

These events are taken to represent important points of departure for the early formation of an electricity market reform research program at the Center for Applied Research (SAF¹⁹) in Bergen in the early 1980s, which became a key node in the electricity market reform network and a driving force in later events.

The development of a market reform collective is then described and analyzed from three different points of observation. First, from the perspective of economic theory developments internationally and the links from these developments to early market reforms and market re-orientations in Norway before the electricity market reform. The second perspective is obtained from a focus on the emerging SAF research institution in Bergen, on the electricity system research done by its director Einar Hope and some of his colleagues and on the gradual shaping of an electricity market reform research program. The third is derived from a focus on the state administration which engaged in the project, on the social democratic modernization project in the late 1980s, on the Ministry of Finance, where Tormod Hermansen from 1986 obtained an important governance and managerial position from where the market reform process got orchestrated, and on the links between the SAF in Bergen and the Ministry of Finance at the time.

Through this triangulation I hope to be able to extract the major ingredients of a coherent explanation about why and how a market system became a possible, operational alternative to a system where apparently no-one had thought of it as a relevant, possible or rational option until then.

Part 4: Transforming the electricity industry

In this final part, which covers chapters 11 through 13, I will first present a sequence of events in between the political initiative to support and mobilize a market reform alternative, through the political rivalry with a hierarchical restructuring alternative program in parliament, to the decisive breakthrough for the market reform alternative with the approval of the new energy law by parliament in June 1990. Then, I will describe some of the many initiatives and projects which were launched by the market reform collective within the state administration and the SAF in the wake of the legislative breakthrough, initiatives to re-shape, re-configure and re-format many different aspects of

¹⁹ Senter for anvendt forskning

sector institutions, electricity companies and economic actors within the sector. I focus in particular on the formative role of accounting systems and regulation and control models and technologies in this process which contributed to the “creation of competitive firms”, “profit oriented natural monopolies” and “rational calculative economic behavior”.

Through these many projects, the market reform program which had been designed from an iteration between empirical research and economic theory, gradually stabilized itself as a robust real world economic system. The robustness became tested in two severe instances of relatively extreme opposite weather conditions in 1992 and 1996. My intention is to demonstrate that this robustness and stability followed from a successful carrying out of the broad range of interrelated projects - in combination with the support received from within the sector and from the many different actors who entered the sector to exploit business opportunities and to advice “institutional actors” on issues of organizational change – those described by John Meyer as “the institutional others” (Meyer, 1996).

Finally, chapter 14 will provide summary, discussion of findings and major conclusions.

Part I:

Research strategy and methodology

Introduction

The objective of this first part of the analysis is to present the research strategy, the methodological framing and the analytical concepts by which I will embark on the empirical material. To present the actor-network approach is of course a core aspect of this exercise. As a basic point of reference, it should be noted that the approach is not yet another theory of the social or a provider of explanations about for instance what makes society exert pressures on actors. It is simply a methodology, “a very crude method to learn from the actors without imposing on them an *a priori* definition of their world-building capacities” (Latour, 1999:20).

To present the ANT is relatively demanding, as the approach tends to deviate in a paradigmatic sense from the framing and the analytical concepts which have become stable, taken-for-granted, natural or even self-evident ways of looking at things among socio-economic sciences. One example would be that the traditional distinction between macro- and micro order of society vanishes as the “order of things” are turned into *circulating references* hooked on to by humans as well as non-humans in different locations (Latour, 1999). Both orders of things and aspects of individual subjectivity are thought of as being elements of a variety of such circulating references which may be more or less extended and thereby part of the shapes of society and its many actors and activities. The advantage is that now we need not explain the order of things at the micro-level with reference to either a macro-order on the basis of concepts such as “culture”, “structure”, “political regime”, “institutions” or the like, or to pre-given and general characteristics of the individual. Rather, such explanations can be obtained *within a single, variable social world* – represented by the local actors and the circulating references they have hooked themselves on to.

Another radical aspect of the approach, is that it rejects the separability of things which traditionally have been compartmentalized as providers of different sources of change and shape – like technology, economy, industrial structure, science, politics, organizations, social networks. etc. On the contrary, the approach recognizes that these always co-exist, that both shape and change are represented by interrelated elements from various of these camps, and that different juxtapositions of elements jointly represent alternative approaches to which one may associate or disconnect. By linking a specific technology with a specific economic shape along with other elements, a unique “system alternative” may be put together and turned into another circulating reference. The framing of actor-network studies, is directed towards the making of these interrelated phenomena, their linking up with other elements, their *performing* of other elements and their possible

stabilization in society as durable systems which may come to represent a new “natural” or “self-evident” order somewhere. The result is a concentration of attention on movements and linkages between empirical details and the framing of them represented by actors within the field of inquiry. The network aspect of the actor-network concept is not quite the same as the opponent pole to the actor which makes sense to the actor and order his world. It is rather an ordering of a fraction of his world which he may even detach himself from. Neither is it an anonymous field of forces pushing something towards a particular shape and meaning. It is the sum of interactions between various kinds of elements, devices, humans, inscriptions, forms, etc. into very local, very practical and even very tiny locus (Latour, 1999:20).

I have chosen to include a - perhaps too extended - presentation of a collection of actor-network analytical concepts in order to make up for at least some of this possible lack of familiarity. The analytical concepts which will be presented, are there to make it possible to operate and to move around in this “floating world” of circulating references and elements which may hook themselves on and off. They are there to describe and to explain things. To characterize the circulating phenomenon that I am particularly interested in here, I have chosen to use the concept of an entrepreneurial collective – which provides more extended associations to whatever is involved in change-making and stabilization of new industrial and economic shape and order. The concept however, may also be used as a synonym for actor-networks of this particular type.

In chapter 3, I have included a discussion of a very interesting case study conducted by Patrick McGuire, Mark Granovetter and Michael Schwartz about *the social construction of the early American electricity industry*. The purpose is threefold: First, it serves as a step into an historical inquiry into the making of the electricity industry internationally, which came to represent a given point of reference also in the Norwegian case. Second, it serves to contrastate a sociological approach based on social constructivism and the relative importance of interpersonal networks in the making of industries, with the actor-network approach. Third, it serves to demonstrate a research strategy and a mode of explanation which is much more similar to the actor-network approach than would the different theoretical approaches suggest. The case may accordingly serve to illustrate my research strategy as well as much of the methodology outlined in chapter two. Finally, in chapter 4, I will provide some additional comments regarding methods.

2 Analytical framework and concepts in sociology of industries and economies

Sociology of science and technology has from the late 1980's emerged as an influential area of theorizing often denoted actor network theory (ANT). The concept of an actor network was initially presented by Michel Callon and Bruno Latour in "Unscrewing the Big Leviathan – How do Actors Macrostructure Reality?" in 1981²⁰. The idea basically grew out of Callon's sociological studies of technological and industrial change processes, while the new analytical concepts to be applied to a large extent emerged out of Latour's science studies developed with Steve Woolgar in "Laboratory Life: The Social Construction of Scientific Facts"²¹ published in 1979, and out of "Science in Action" from 1987. An important source of influence appears to have come also from semiotics, which at the time emerged to exert a substantial influence on the philosophy of science (Boyd, Gasper & Trout, 1992). The actor-network theory may thus be seen as a *semiotics of materiality* (Law, 1999:4) in which the idea that a semiotic sign derives its meaning from its relations to other semiotic constructs is extended to material things and humans. All entities exist and are defined and produced so as to achieve their form as a consequence of their relations to other entities. This shaping is essentially uncertain, variable and reversible and never given in the order of the things in themselves. This leads to a concern with how durability is achieved, which has induced specific actor-network concepts of power and stability, which are core concepts in this study.

The development of a new sociology grew from the 1981 article and from early "anthropological" studies of the work of scientists and technologists, into a more complete philosophical and sociological theory by the end of the 1980s and early 1990s. The new theory outlined an innovation-perspective

²⁰ Callon had been working with sociological studies of technologies and industries, where as Latour had been working with Steve Woolgar on anthropological studies of scientific work. The 1981 book-chapter presented their initial joint formulations of the idea that existing sociological theory could not be extracted to explain science, technologies and industries, but on the contrary, that new theories about science-, technology- and society-making were needed to redefine sociology on the basis of more dynamic concepts (Laursen & Olesen, 1996).

²¹ In the 1986 edition of the book, the word "social" is excluded. This reflects Latour's deviation from the social constructivist position at the time.

rather than the more structural accounts and perspectives typical for the traditional sociology²².

As noted in the introductory, there are certainly other theoretical traditions which share at least some elements with the actor-network approach. In particular the neo-institutional organization theory tradition²³ appears recently to have been linking up with the ANT in the area of organization studies (Czarniawska and Sevón, 1996: 5-8). Others have contributed with concepts which bear on somewhat similar basic approaches. An important contribution comes from within a tradition usually denoted “New Economic Sociology²⁴”, in particular represented by Mark Granovetter, focussing on the embeddedness of economies and industries in social (interpersonal) networks. These networks are seen as endogenously defined actor-structure entities made up of relations between humans, and the essential point was to argue that such networks play particularly powerful roles in the structuring of industries as well as in the actual functioning of markets²⁵.

For instance from (Veblenian) institutional economics, this network concept may be refined through its pointing at the essential role of purpose in social

²² It thereby apparently challenged the domain of sociological philosophers of science represented for instance by H. M. Collins and S. Yearly who through their theories had substantially contributed to the downfall of positivism in the early 1970s. The new actor network theory attracted growing interest from science and technology researchers, which fuelled a fairly harsh rhetorical attack on the new school of thought from the sociologists (or social realists as they preferred to denote themselves) over whether or not there was a need for Latour’s new dynamic concepts. In particular after the publication of the French version of “We have never been modern” in 1991, where Latour presented what he saw as a way out of “the philosophical deadlock situation of the social constructivist research program in science studies”, the social realists apparently felt the wind was no longer blowing in their direction. The discussion is found in Collins, H.M and S. Yearly, 1992: “Science as Practice and Culture”

²³ The tradition of Walter Powell, Paul DiMaggio, John Meyer, Lynne Zucker, Richard Scott etc.

²⁴ The area of theorizing denoted New Economic Sociology emerged from work in the early 1980s by sociologists like White (1981), Stinchcombe (1983), Baker (1984) and Coleman (1985), but received its “new” label after the publication of Marc Granovetter’s celebrated article “*Economic Action and Social Structure: The Problem of Embeddedness*” in 1985. The article spurred the entrance of sociologists into the area of market and economic research, which at the time largely had been left by sociologists as a domain occupied by economists (Swedberg, 1997).

²⁵ See for instance Granovetter, 1973, 1985, 1990, and McGuire, Granovetter and Schwartz, 1993))

and economic change processes and to the roles of non-human phenomena like institutions, money, resources and technology in processes of change characterized as “trajectories towards improving the methods of doing things”²⁶. By combining the two schools of thought, we may arrive at a network methodological concept with many similarities with the ANT, in which concepts, objectives and entrepreneurs rather than social relations move to the focus and where the network is opened up to include non-humans as important explanatory elements.

The idea about embeddedness of economies and industries in networks of this kind is presented in Granovetter’s 1985-article, but the argument goes back to his earlier work on network theory presented in “*The Strength of Weak Ties*” (1973), which has an intriguing aspect to it in the sense that Granovetter does not perceive of a social network as something which is framed and constituted by the existence of some external institutional or other (macro-order) context-shaping elements. Rather, the identities, objectives, interests and other characteristics of the actors which constitute a network are taken to be variable outcomes of types of relations which hold the actors together and thereby define the network as well as the actors. It is thereby possible to characterize actors by the distribution of and the character of their relationships to other actors. Changing phenomena can thereby be described completely in terms of mutual shifts in relations between actors, and thereby escape the “imprisonment” of having to result from changes in their environments or from assumed characteristics of the macro society.

In his 1973 article, Granovetter used this concept to explain why an actor who is completely interrelated into one network loses the capacity for making choices which differ from that of other actors within the network, because his characteristics will be locked into a network of relations which is defined by common identity, objectives, interests etc. Other alternatives will thereby be redundant to him, where as actors that are located at the intersection of two or more different networks - denoted network overlap - may switch their relations or link relations in new ways.

The aspect of Granovetter’s network theory which is particularly important to this study, is that it identifies and conceptualizes those entities that are hold together by similar identities, objectives, interests etc. as dynamic, point-relational networks as opposed to theories based on constructs which describe separated spaces, areas or levels such as in sociological system

²⁶ See for instance Daniel Bromley, 1990, 1998

theories. These networks – even though open and interacting with networks of different identities, objectives etc. – may also be capable of acting in coordinated ways in order to achieve their objectives and interests, to confirm their identities and so forth. They may constitute endogenously defined entities that are engaged in reshaping society projects or in maintaining specific social order in some respect. The “entity” which created and carried through the electricity market reform, may thus be seen as such a network; a “market reform network” which is defined by its own unique inter-relations.

The interpersonal network approach by Granovetter has however received some criticism - also from within the New Economic Sociology, from those who represent the more cultural perspective – like Viviana A. Zelizer and Paul DiMaggio. They criticize the tendency in economic sociology to reduce everything to social relations and networks. Rather they argue for a “well balanced analysis which would simultaneously take structural, economic and cultural factors into account. The goal would be “to plot a middle course between cultural and social structural absolutism” (Zelizer, 1988, cited from Swedberg, 1997). Zukin and DiMaggio (1990) argue that the concept of embeddedness in networks of social structure is of great importance, but that there are also other types of embeddedness, like political embeddedness, cognitive embeddedness and cultural embeddedness, which have to do with beliefs, ideologies, taken for granted assumptions, rule systems etc. Granovetter’s interpersonal network theory is found to be too narrow to fit these complexities of real-life economic activities and systems. Or, to quote another critical voice from within economic sociology:

“The major downfall of the network approaches is that they are such sparse social structures that it is difficult to see how they can account for what we observe. Put another way, they contain no model of politics, no social preconditions for [the economic institution in question] and no way to begin to conceptualize how actors construct their worlds”. (Fligstein and Mara-Drita, 1992:20, cited from Swedberg, 1997))²⁷

The problem seems to be that whatever is not perceived of as a “social relation” is lost by the approach, which leaves numerous relevant variables on the outside of what the explanatory device “network” is made of. With

²⁷ My underlining

the actor network approach however, we may recapture what has become lost by the social network theory – included a conceptualization of how actors construct their worlds.

The idea that the economy is performed by economics as a scientific discipline, also has roots in (Veblenian) institutional economics. One example is Daniel Bromley (1990) “*The Ideology of Efficiency. Searching for a Theory of Policy Analysis*”, where he argues that economics has the essential properties of an ideology for the advancement of economic efficiency in society. We may thus infer that economics can be seen as representing a specific purpose of the future which constitute the essence of a system which is engaged in shaping developmental pathways or trajectories in society, and thereby in shaping institutions and behaviors consistent with this particular purpose. Through the work of those associated with economics, economic methods of doing things are being changed, improved and implemented. When it comes to organizing economies, what Veblen saw as the intellectual problem; “... the sequence of change in the methods of doing things”, is to a large extent found in the history of the economic sciences themselves, which represents the history of cumulative change in the methods of making economies work efficiently.

2.1 The concept of an actor network

The word *actor-network* was invented to describe the agent-structure entity implicit in the new theoretical perspective, and to serve as a linguistic tool to describe scientific and technological activities - to move around in the “new floating world” of science and technology which emerged after the rejection of traditional positivism. It was constructed to describe those entities that were engaged in both the creation of new scientific knowledge and technologies and in their own implementations as durable and extended phenomena in society.

It is essentially a methodological concept rather than a description or theory about any part of society. The word has accordingly nothing to do with the traditional technical meaning of the word *network*, such as gas pipes, electricity grids, computer networks, or with the traditional interpretation of social networks such as associated with friendship, family or neighbor relations. It is rather a pure linguistic construct which contains a generalized concept of “*an acting network*” which is constituted by the relations between its nodes in a similar way as the concept of a “social network” in Granovetter’s 1973 article. However, here the concept is a pure analytical statement without the “social” being associated with it; a concept which can be applied to any phenomenon. Human as well as non-human. Social as well

as cultural, political, technological, financial etc. This “tautological” character of the concept is basically the reason why it becomes a powerful analytical device, similar for instance to the concept of utility-maximization in economic decision theory or the concept of embeddedness in contemporary sociology.

The actor-network concept represents the starting point for an extended theory about changes in society - a sociology based on concepts which describe change-making. The core of the new program is the actor-network concept. It is a hybrid construct; a network which is both a relational structure and an acting entity. In opposition to both contemporary sociological analytical concepts and the analytical concepts developed by the various new complexity and system theories (like chaos theory) so popular in the 1980's, the actor-network theory offers a simplistic methodological toolbox based on one-dimensional basic concepts; *points and lines* (relations and nodes), as opposed to the three- and two-dimensional concepts applied by those other traditions, which describe such entities as “systems”, “spheres”, “environments” and “levels”. In some sense, the actor-network theory became a device for the “destruction” of systems, spheres and levels which appeared to be separated from each other. It turned the attention towards their interrelations and mutual influences. Rather than surfaces and rooms, the analyzer got lines and links and points, where the points had as many dimensions as they had links.

The application of one dimensional concepts also implied that whatever is in between the lines disappears. The analyzer does not have to think of the entire room or level. If he for instance regards the environment of something, he does not have to deal with the continuity of it in all three dimensions. It suffice to identify the interesting points and the lines in between them, which gives him a more focused attention on what exactly in the environment is relevant to the something. What is also obtained from the construct, is that the analyzer avoids the implicit dependency on geographical concepts of distance and room. Two entities can be seen as being closely united even though the geographical distance between them is large. Or they can be radically separated even though they are geographically close to one another. Also the scale distinction disappears from the analytical framework, like the micro-macro distinction. Rather, there is a concept of relations and of networks that are never “larger” than others, but more extended and qualitatively more closely integrated. The ordering into top and bottom disappears and all phenomena are studied in the same way.

In order not to take things for given, all of these distinctions are excluded from the toolbox of the analyzer and handed over to what is to be studied

empirically, to what is represented by the objects of study. In a sense, the concepts excluded are being regained from the actors of the field of investigation. The effect, is that the analyzer from a second order level of observation obtains a greater freedom to maneuver in between what is generally accepted as the elements which make up society; its vertical room, its hierarchy, its separation into layers, its macro-micro scales and its totality in order to describe and explain how these categories are achieved and altered and what they are made of (Latour, 1996: 51-55).

What is lost, is apparently an analytical sense of the importance of distinctions identified by using concepts based on spheres and levels – like the administrative versus the political spheres, the public versus the private room etc. To regain such contrasts on the basis of one-dimensional concepts, is apparently an ongoing project within the actor-network tradition, which I will not go further into here.

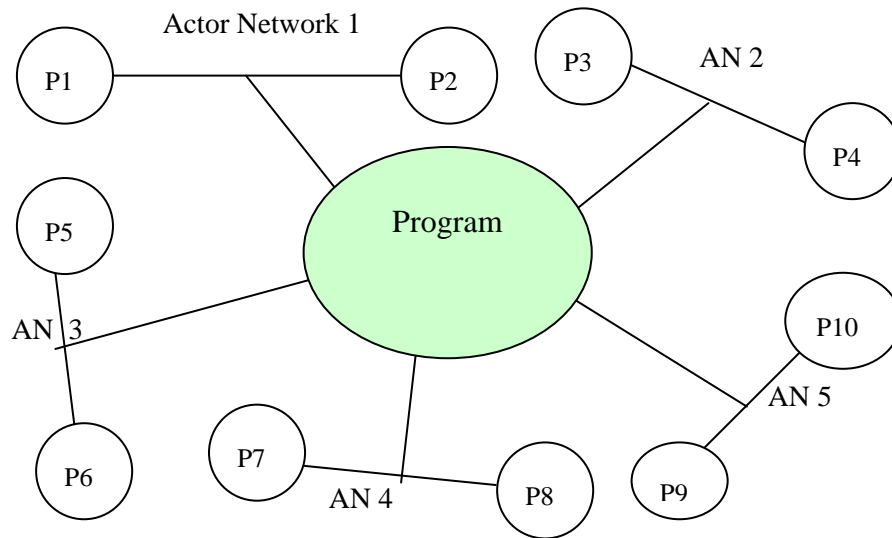
To this network point-line concept, it is added an actor concept, which permits the network to explain dynamic phenomena in terms of its own actions. According to Callon and Latour, science, technology and economies are outcomes or effects of lots of actions and work within actor-networks with specific empirical content. In order to explain changes, one accordingly has to follow the actions of these actor-networks in their actual making of society. The point-line-actor concept permits us to follow how a given element moves from an individual to become part of a collective and back again, through linking up with other elements or through separating itself from them.

The concept of an actor-network is said neither to be reducible to an actor of its own nor to a network of relationships. It is exactly both at the same time. Neither is it linking elements that are perfectly defined and stable. It describes an open entity. The elements could at any moment redefine their identity and mutual relationships in some new way and bring new elements into the network. It is accordingly simultaneously an actor whose activity is networking with heterogeneous elements and a network which is able to redefine and transform what it is made of. Its stability is dependent on the stability that is generated by the actor-network itself. The actor-structure problem is thereby conceptually “bypassed” by including both into one and the same analytical concept.

The actor-network concept is applied by Callon and Latour to define the entities which make up heterogeneous associations engaged in the making and remaking of society – also denoted “collectives”. These associations are seen as structured around core scientific, technological, economic, political

or other types of *programs*. We may visualize the definition of a collective in the following way:

Figure 2.1. Definition of a collective



P = point, node

The actor-networks AN 1....AN 5 are hold together through their individual relations to a common program. Each of the points P1... P10 can be described as a conceptually similar actor network, and the entire collective may be seen as a point in some more extended actor network.

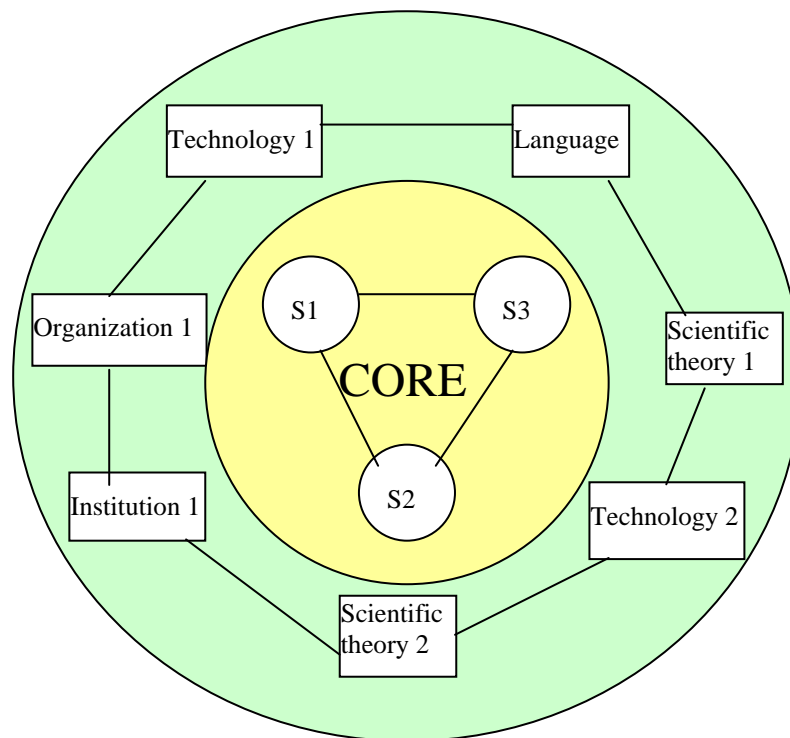
2.1.1 The concept of a program

Each program contains core simplified and structured concepts as well as relational systems of language, theories, technologies, institutions etc. that are developed and interrelated, as well as being building blocks in a project for transformation of society in some respect. These are similarly seen as points in the network, jointly denoted "actants". The success of an actor-network is equally dependent on the success of each of its actants in their interactions with society (Latour, 1991)

The program, according to Callon and Latour, has a specific core which separates its collective from others, as well as an entire internally consistent system of actants surrounding it. The program is itself interpreted as an actor-network structural system which can be separated into what is denoted

basic simplifications. These have been constructed through “*blackboxing*” of complex phenomena and make up the building blocks for the micro-theory of a program. Hence, the making of a program has to do with the combination of a radical reduction of complexity with a specific framing.

Figure 2.2. *The concept of a program in Actor Network Theory*



S = Simplification

In order to succeed, the entrepreneur, when pushing for an innovation project, will have to simultaneously deploy visions about a future end into which his project fits in, and to reframe some aspect of the world in order to make others see the context and rationale of the project. These visions (or frames) are produced in order to convince non-members that the realization of the project will produce attractive improvements, for instance in terms of increased efficiency, convenience, profitability or truth, and that the project “fits into” other elements of society. They also contain political and sociological ideas that are much broader and richer than the simplified core,

which permits for the linking up to a broader range of other networks and for the generation of coherent persuasive powers towards other actors in society.

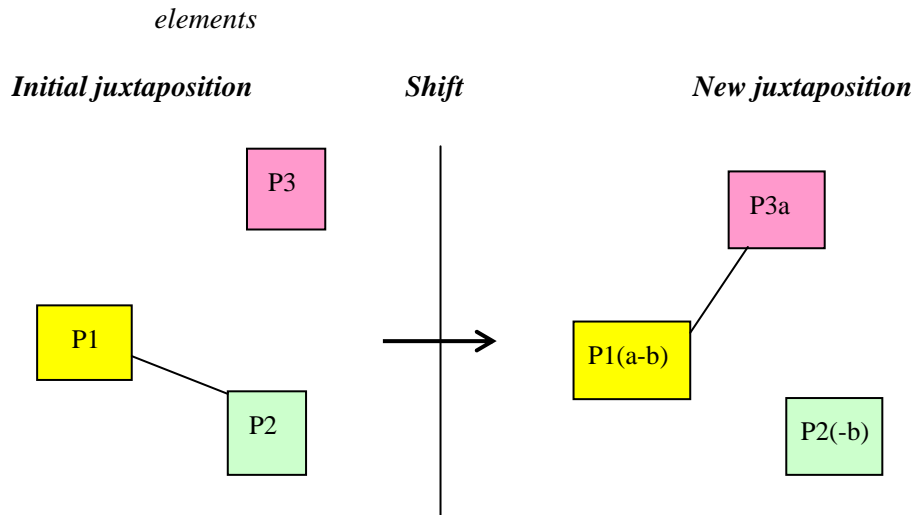
Hence, even though for instance the electricity market reform can be seen as being initiated and pushed by an actor-network with a main stream economic core program originated from a vision about some future state of “optimal efficiency”, the realization of its innovative project in society is dependent on a joint formulation of economic, sociological and technological theories and operational strategies. The transformation process can accordingly be seen as guided by a continuous mix of these types of theories. They define a new economic-technical-sociological history and future, identify the roles to be allocated to various actors and the enrollment of certain properties into them. It has to do with the building of a world in which everything has its place.

2.1.2 Transformation of content through shifts in actor-network relations

Two mechanisms are taken to be essential to the shaping of the actor-network: *simplification* and *juxtaposition* (or structure of associations between simplified elements). Simplification has to do with the reduction of an infinitely complex world to a series of discrete entities to be maintained as long as other entities do not overthrow their ability to represent reality, for instance by dividing them into unmanageably many different elements. Thus, simplifications are never guaranteed and will have to be tested in the actual making of society. Juxtaposition has to do with the structural ordering of the simplifications in unified core concepts. Simplification exists only in context, in relation to other entities to which it is linked. If one removes one of the elements, the structure will shift and change. Juxtaposition requires that elements are simplified. They define the conditions for operation, makes up the coherence, consistency and structure of relationships between the elements.

Through this construct, the ANT authors establish an analytical device which is based on stable “points” in the form of simplifications, but which is also able to change and to transform through the shifting of relationships between the points. To shift a relation from one point to another is accordingly associated with a mutual transformation of content. We may accordingly separate the concept of transformation (or re-shaping) into two different concepts; re-structuring (or re-configuring) and re-formatting, which refer to the change in structure and the change in content respectively. The mechanism is illustrated in figure 2.6.

Figure 2.3. Transformation of content through shift in relations between



P1 qualitatively different from P1a

P3 qualitatively different from P3a

P2 qualitatively different from P2(-b)

a = mutual element in transformation of P1 and P3

b = mutual element in transformation of P1 and P2

By shifting its relation from P2 to P3, the point P1 loses its characteristic (b) which followed from its mutual relationship to P2, and gains the characteristic (a) which emerges from its relation with P3. Both P2 and P3 are affected accordingly.

This concept may for instance serve as a starting point for the analysis of collective cognitive transformations associated with radical conceptual changes in economic systems, by which for instance concepts of property rights and economic rationality may switch as people and organizations disconnect themselves from one collective and re-associate with another.

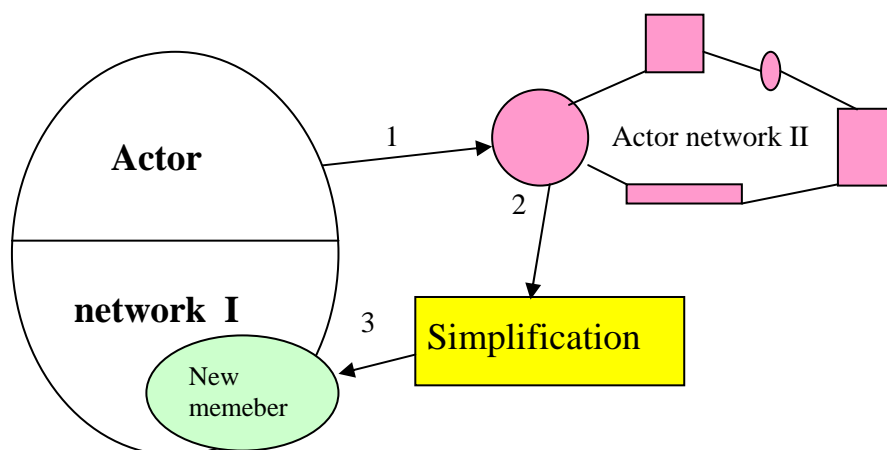
2.1.3 Simplification and enrollment

The basic concept of change in the actor-network theory is tied on to an active-passive distinction, where the actor concept is thought of as the element which contains the driving force for change, the acting capability which causes some point to shift its association from one point to another and thereby cause a qualitative transformation. The network concept is the passive partner which is being acted upon.

A related concept is “the act of simplification” or “enrollment” or “translation”. This implies that an actor within an actor network through the

act of simplification can include another actor-network into his program by giving it a specific role with specific relations to other simplified elements within its own network. Any actor-network can be simplified by another actor-network and thereby be included into its specific program. The structure is such that every point is at the intersection of two networks; one that it simplifies by defining it within its own program and another that simplifies it. It can accordingly be mobilized in other actor-networks for the fulfillment of their specific programs. On the other hand - according to Latour - any specific actor network can only hold its points together if the different entities concerned accept the roles that are assigned to them by the actor-network itself, which will also include any hierarchical-solidarity position affiliated with the roles (Latour, 1991). This requires that for some simplification to be established as a stable element, it has to be tested in real-life practice.

Figure 2.4. The act of simplification by an actor of another actor-network (enrollment, translation)



This concept may serve to address situations when some entrepreneurial collective is being given important roles within the context of another entrepreneurial collective.

The strategic role of specific actants, is said to follow from the number of relations controlled by a given actant (Latour, 1996a:58). The more relations some actor has to the various parts of his actor-network and the more types of relations he has to each of them, the more significant will be his ability to mobilize and direct complex collective actions by the entire network. The

entrepreneur is often associated with such a strategic position, and accordingly represents a focus for empirical investigations. Hence, when investigating industrial change processes, we should pay particular attention to individuals in such strategic positions.

2.2 The expansion of an actor-network

The important focus of attention generated by the actor-network concepts, is on the emergence and growth of actor-network collectives taken to be originated by some local entrepreneur(s), constituted into local collectives and expanded - sometimes even into global networks with dramatic influences on societies. What characterizes such a process of expansion?

Well, it may now be seen as *a process of translation* (enrollment). On the one hand, there are the actions of actors which generate creative, interacting activities aimed at shaping, extending, creating support for and expanding the entire collective through enrollment of non-members. On the other, there is competition, rivalry and conflict between collectives that are engaged in the remaking of the same elements of society in accordance with different conceptualizations and programs. The expansion of a collective is accordingly seen in a politics-like or a war-like metaphor where elements of society are to be conquered and re-shaped in conflict with other collectives.

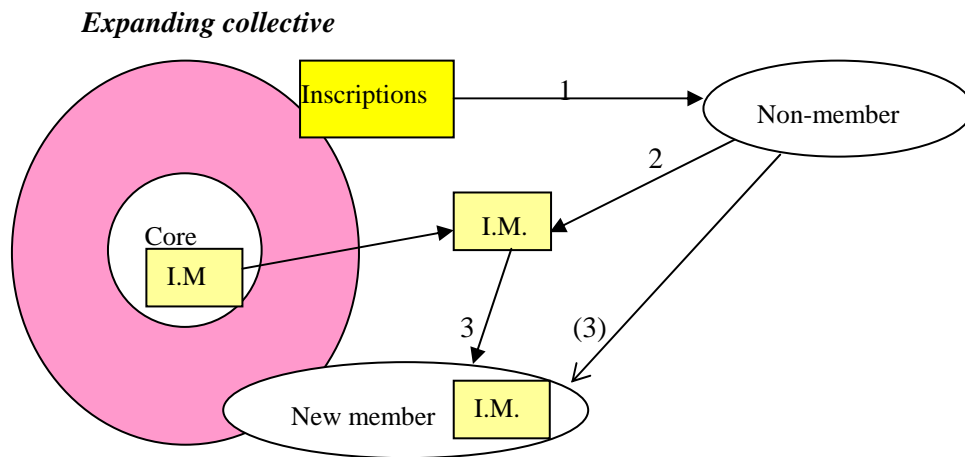
Through simplification (enrollment) of other networks, collectives are capable of linking to each other in complex and differentiated ways in such a way as to influence each others strength and to use each other for the fulfillment of *mutually modified programs* in conflict with collectives which reject simplification/enrollment. In addition to traditional concepts of alliances, the actor-network concept focuses both the differences of perspective and purpose hold by the allied parties and the mutual qualitative transformation of content involved in alliance-making as a necessary ingredient in real-life remaking of society processes. The outcome of a large scale remaking of society process should accordingly not be seen as the result of one single conceptually unified program, but as the result of mediated programs of different collectives which have engaged in the process in order to fulfill a variety of objectives.

The creation of new allies is related by Latour to the affiliation between new actants and what he calls “*immutable mobiles*”, which represent the “core simplified concept” of the actor-network. These are series of simplified and unchangeable elements which defines the uniqueness of the actor-network; the explanatory device that essentially distinguish the member from the non-

member. In order to expand, the actor-network has to be attractive to non-members or forceful so that those who are on the outside get on the inside. The actual act of being a member is seen as taking place through "obligatory passage points" of the specific actor-network which constitutes the new actant through the affiliation between the new member and the immutable mobile.

The "weapons" of these kind of "battles" for members are taken to be "*inscriptions*" - that are basic simplified statements, models or visualizations which represent the objective of the actor-network as well as rationality, truth, efficiency etc. that are used as rhetorical devices. These inscriptions can also be "*loaded*" with technologies and institutional elements, seen as affiliations between the content of the immutable mobiles and specific non-human actants that are mobilized through actions intended to increase the transformative power of the inscription. The activities of actor-networks of this type has to do with the production of convictions, authority and power in order to expand (translate) the immutable mobiles into new "territories" and to create stronger associations between its members.

Figure 2.5. The expansion of a collective through translation



I.M. = Immutable mobile

1: Persuasion

2: Intention of becoming a member in the expanding collective

3: Association and translation of non-member into collective

The expansion of a collective, is accordingly defined on the basis of a variety of additional analytical concepts, like "immutable mobiles", "inscriptions", technological and institutional "loads", "associations" and "translation/enrollment". These are all analytical statements which jointly constitute a toolbox for empirical investigations into how entrepreneurial collectives expand and thereby may radically transform elements of their environments.

2.2.1 The concept of representation, and the role of delegation in the expansion of collectives

An important aspect of the theory of actor-networks is added from Latour's attempt at incorporating a historical account of relativity theory (Latour, 1988 and Latour, 1996b). The basic idea is that the perspective of an actor depends on his position within some stabilized actor-network and that an actor-network always constitute a relative local phenomenon from which you can only escape by shifting to another actor-network which is also a local phenomenon. There is no position on the outside of any actor-network

from where one may overview the world and act upon it. The overview and the powers of some actor is accordingly always limited.

Recognizing this relativistic insight has two important implications. First, if a collective shall be able to expand beyond the limits of the overview and powers of its enunciators, it has to produce durable representations of its program and its powers in entities which can serve as delegates in the expansionary process. The production of such delegates becomes a crucial condition for expansion. Without such representations, the program cannot expand into additional localities and will remain a local phenomenon with limited capacity to remake society. Investigations into the Norwegian electricity market reform accordingly have to dwell with the generation and linking up by its entrepreneurs with adequate representatives of their program.

Secondly, there is always the possibility that actions taken at the outside of the overview and the powers of some collective, will interfere into its “local world” and thereby introduce what will be perceived of as a *chance event* which may substantially influence on the outcome of the remaking of society process in which the collective is engaged. Hence, chance events are not just stochastic. They follow from the limited overview and the power-constraints of local collectives.

Chance events not only follow as a consequence of programmatic differences, but also as a consequence of time, because the intersection of two collectives at two different points in time will provide different conditions for choices and actions by the actors, which will of course lead to different outcomes. Time is accordingly likely to constitute a crucial strategic variable to collectives engaged in the remaking of society.

2.2.2 The concept of power in actor-network theory

The actor-network theory offers the opportunity to rephrase traditional questions of social order, stability and change, and in particular questions about the origins of and durability of domination of power. Social theory has always been concerned with the definition of power relations, and there exist a substantial number of such. What has been achieved however, are primarily conceptions of power relations which stems from their structural character. It is however difficult from these definitions to see how domination is achieved in the first place. This is what is offered by the actor-network concept of power. The actor-network theory offers the possibility of holding both human and non-human elements of society together as a durable whole and thereby to define power as a function of this “holding together”.

The underlying simplified principle is illustrated by Latour (1991) by showing that the force by which a speaker makes a statement is never enough to predict the path of action that will follow from the statement. It depends on what successive listeners do to the statement. The speaker can try to make sure that every listener interprets the statement the same way, that is, to make sure that the correspondence between the linguistic and the content of meaning is standardized. Or, he can support his statement with further loads like adding certain technological devices or institutional arrangements to it. How much loads he will have to add largely depends on the listeners' resistance or ignorance, carelessness or mood, and on their cleverness. Hence, the program of the speaker counters an anti-program of the listeners, which in order to be overturned generates an anti-anti program by the speaker intended to convince or force the listeners to conform to specific acts in line with the statement. It is only when most of these anti-programs are countered that the statement can generate predictable acts in concordance with the statement.

Through this process, the statement has been transformed into a much more complex system with persuasive powers far beyond that of the initial statement. Also the speaker, the listeners and the elements included have been transformed into a new juxtaposition which can now be characterized by some durable power structure. The speaker here holds the role as the enunciator of the actor-network who's statement becomes reality by the adding of means of transportation of the statement and through the transformations of actors that are undergone in the process. Rather than focusing the division between society and the theoretical superstructure that can be extracted from it, the concept focuses the division between naked and loaded statements as the main ingredient in the formation of power.

To investigate the power of an actor-network accordingly involves the evaluation of the program of action of the enunciator of the actor-network, seen as different means of transportation (loads) of its programmatic statement in terms of associations between the statement and different non-human actants that are intended to expand the actor-network by including more actors into conformity with the statement. *Power is not the property of any one particular of those elements, but of the aggregated chain of elements.* During the process of transformation, different human and non-human elements are turned into associated entities by the accumulated actions of the enunciator, into different degrees of attachment and into associations which can be reallocated either because the enunciator stops reproducing his actions of power or because the entity is challenged from another actor-network.

This conceptual understanding links power to the continuous efforts to expand the actor-network by means of applying new acts (loads). “The understanding that there exist some state in which the internal force of innovations are irreversible and would expand through society by their own steam, is simply dissolved” (Latour 1991: 118). Nothing becomes real to the extent that it does not need an actor-network to keep up its existence. Every innovation has to hold on to all those people, institutions, organizations and technologies that themselves hold on to the innovation.

This also accounts for the breakdown of power caused by the rejection of anyone of the core actants of the actor-network - either because of strong anti-programs encountered or because simplified elements are forced into unmanageable complexity through real-life tests. Such events cause a breakdown of power - and as a consequence - of the collective itself as the “holding together” is falling apart.

The conception of power as something which is generated in the interaction of programs, anti-programs, anti-anti-programs etc. points to possibilities for modifications and negotiations which are not only tied on to the exchange of benefits or utilities. Negotiations also involve the powers of conviction and the ability to produce “loads” of persuasion. To investigate the expansion of some collective, accordingly, has to do with investigating its construction of acts and loads of persuasion aimed at including more actor-networks, and its efforts to undermine core concepts in the program of rival collectives in order to force a breakdown in their powers.

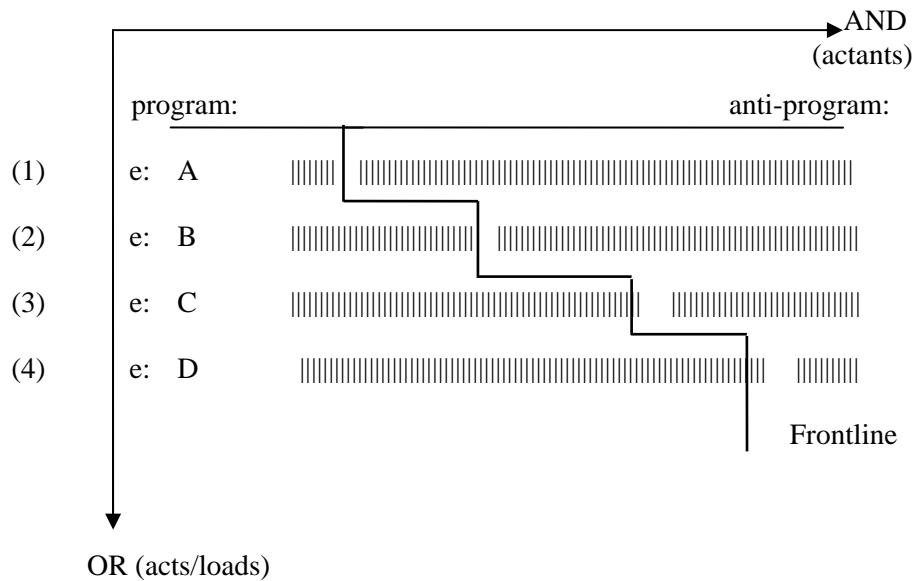
This implies that the ability of a program to counter an anti-program also depends on how well an actor’s conceptions of others corresponds to their conceptions about themselves. If the difference is large, the actor will populate his world with actors that behave in - for him - unpredictable ways by apparently leaving and entering his network arbitrarily. The larger the difference, the more substantial must be the “loads” mobilized and the more likely will be a breakdown of the program or a substantial modification through negotiations with the anti-programs. The innovative entrepreneurial collective may accordingly arrive at a compromise solution and progressively change its political-sociological interpretations and associations as well as the shape of the innovative devices or systems they develop.

2.2.3 The concept of rivalry across frontlines

The “frontline” model presented by Latour (1991:107) may also be useful to illustrate the rivalry between a collective with some specific program of

action, and another collective with some specific anti-program of action. The program is located to the left and the anti-program to the right.

Figure 2.6. The frontline model



Source: Latour, 1991:107

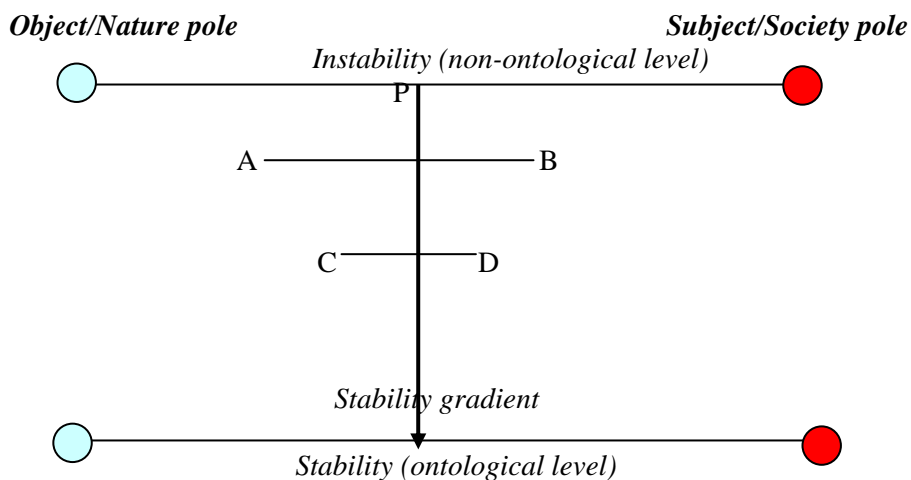
The OR dimension represents various acts (B, C, D, etc.) which the enunciator (e) can add to his simple statement (A) in order to counter the anti-programs of his rival. The AND dimension represents the actants of the rival actor-network which are the objects for association and transformation. By using the resources and the powers he controls - whether financial, institutional, technological or scientific - to invent and add new acts (loads), the program is gradually capable of expanding its "statement" by enrolling new actants into its own network; the number of actors that have attached themselves to the innovation. The point of view is here taken to be the enunciator of the expanding actor-network. A similar model could of course be drawn which focuses the viewpoint of the rival. Hence, in case an act is overturned by the anti-program, the frontline will move to the left rather than to the right. The selection of and adding of new acts accordingly takes the form of a continuous testing of the capability of the program to make and remake society by overturning its anti-programs.

2.3 The concept of ontological stability as an approach to path dependency analysis

The final concept from the Actor Network Theory that I will address, is extracted from a detailed philosophical discussion in “We have never been modern” and in “One more turn after the social” (Latour, 1992), which is really a critique of Kant’s separation of nature and society into separated objective and subjective poles respectively, commonly seen as a fundamental basis for scientific thought. Latour argues that the ontology of things requires that the two poles are related. The strong separation represented by Kantian philosophy should accordingly be discarded along with the attempts of both the natural realists and the social constructivists to regard the two poles as unbalanced in either direction. These arguments also represent the core of Latour’s critique of social constructivism.

The distinction which he suggests as an alternative to the nature vs. society concept, is that of ontological variation; the distinction between an entity which exists for instance in the form of an idea or a vision and its existence as a material and social reality. The distance between the new poles would represent the distance for instance between an initial scientific discovery and the transformation of some aspect of society generated from the new insight. In order to account for existence in the real world, “*any entity should also be logged according to its degree of stabilization*” (Latour, 1992:284). An entity, within this framework, would accordingly be defined within a two dimensional scheme with Nature-Society as the opposite poles of the horizontal axis and a stabilization gradient ranging from instability to stability on the vertical dimension.

Figure 2.7. Variation in ontological stability



An entity can accordingly be defined for instance as the line AB, which crosses the meeting point (P) of Nature and Society and has some specific level of stability. Another entity might be described as the line CD. This construct permits Latour to maintain the difference between the "points" A and B or C and D, so that A and C are said to have Nature status, where as B and D have Society status, while maintaining that any entity (phenomenon) also represents the line in between, which incorporates both. The stabilization gradient, on the other hand, permits Latour to differentiate the ontological status of different entities in society:

"As soon as we consider two sets of coordinates for every single entity – its degree of naturalness or socialness on the one hand, and its degree of stabilization on the other – we become able to do justice to the variable ontology of the entities we all studied in our case studies. (Latour, 1992: 286)

A variety of words has been used to define the elements of such trajectories: "quasi-objects" (Serres, 1987), "actor-networks" (Callon, 1986), "forms of life" (Shapin and Schaffer, 1985), "experimental practice" (Lynch, 1985) and "allies", "collective things", "entelechies", "actants", and "modalities" (Latour). Whatever words used, they cover these elements that vary both in their Nature and Society content and in their ontological status.

The concept of ontological stability applied to collectives, and a dynamic concept of power, permits us to rewind on a theory of path dependency and trajectories in which historical collectives can be seen as highly stabilized ontologies. The creation of a trajectory can accordingly be seen as a process of ontological stabilization of a new collective (circulating reference) engaged in the remaking of some aspect of society. And the breakdown or overturning of a "lock-in", can be seen as following from the overturning of historical collectives by a collective of increased ontological stability. This might follow either from the aggregation of more substantial powers or from the breakdown of simplified programs within established historical collectives – for instance through its inability to pass the real-life test of an economic recession.

In this perspective, the Norwegian electricity market reform may be seen as a process in which ideas/conceptualizations about a market based system through various stages (semi-ontological) are being transformed into a real life system (ontological).

2.4 *Final comments on the methodology of entrepreneurial collectives*

From the above presentations and discussions, I think it is possible to conclude that the “new sociological theory” represented by the sociology of science and technology, offers promising perspectives as well as a number of useful analytical concepts to the study of radical industrial and economic change. It fits fairly well into the theoretical perspectives represented by Bromley as well as into some of the conceptual and methodological approaches and explanatory modes advocated by the new economic sociology²⁸, even though it radically bypasses their theory of “social constructivism”. As such, it provides a more specific methodology to the study of economic and industrial change which emerge from processes of concept-making and purpose-formation. The result of this methodological presentation is a toolbox of analytical concepts which mainly draws on actor-network concepts, but which will also draw on concepts extracted from other sociological and economic traditions, like “lock-ins”, “trajectories”, “institutions”, “breakthroughs”, “commanding heights” and “entrepreneurial collectives”.

As noted in the introductory to this chapter, the ANT does not constitute a theory of what social phenomena are made of, but rather provides a crude method and a toolbox by which to travel from one place to the next and to learn from actors and their constructs without imposing on them any pre-given (a-priori) understanding of their economy- or society-building capabilities. The concepts are deliberately poor, abstract and flexible and of a second order of observation usefulness, so as to avoid re-placing the concepts of and the sociology represented by the actors involved in the change process under investigation. In this respect, it is an “anthropological” methodology rather than a competing social theory. By this, it deviates from the social construction theory and the social network theory in economic sociology. These are theories about the social reality where “social constructions” result from pre-given social phenomena like interests and powers, and where “social network” is thought of as a generalization of empirical observations.

The theoretical perspective outlined by the sociology of science and technology tradition calls the attention to the innovation-aspect of large scale economic change processes and the “active” expansion of economic systems and organizations rather than “passive” diffusion processes – which for

²⁸ Granovetter, DiMaggio, Fligstein etc.

instance are typically represented by (traditional) neo-institutional organization theory concepts like “isomorphic processes”, “diffusion” or “fashions” applied to describe these phenomena²⁹. “No innovation spreads around the world simply by its own steam” may be seen as a core critique of these analytical concepts from a theory of entrepreneurial collectives. To identify those driving forces which “spread economic reforms around the world” through processes of re-conceptualization, re-configuration and re-formatting of economic systems, and to follow these through their many projects, processes and mediations with other circulating collectives, become essential to a study of radical changes in economic systems.

²⁹ An interesting discussion can be found in Barbara Czarniawska and Guje Sevón: “Translating Organizational Change”, 1996

3 The social construction of industry approach

I will now return to the New Economic Sociology to discuss another of its master concepts; that of “*the social construction of industry*” as presented by Patrick McGuire, Mark Granovetter and Michael Schwartz (1993). As noted, the purpose is threefold: First, it represents a point of departure for an historical inquiry into the early making also of the Norwegian electricity industry. Second, the purpose is to compare their social network theory with the actor-network approach on the basis of a discussion of their prime case. Third, it serves to demonstrate and exemplify the research strategy and the actor-network analytical concepts presented on a case which is central in the literature about economic and industrial change. Furthermore, there is also the ambition to extract additional analytical concepts to my empirical investigation into the Norwegian market reform process.

The idea about social construction enters Granovetter’s work around 1987, and together with the idea of embeddedness, it came to represent one of the two fundamental sociological propositions of his later work (Swedberg, 1997: 167). This work can be seen as departing into two different directions – one primarily in the direction of interpersonal networks, like the “business groups theory”, and another in the direction of social constructivism³⁰. The work to be discussed here, represents what I see as the major project within the social constructivist approach, presented in a publication by McGuire, Granovetter and Schwartz (M-G-S) called “*Thomas Edison and the Social Construction of the Early Electricity Industry in America*”³¹ (in R. Swedberg, 1993). What the three authors do here, is to link Berger and Luckmann’s theory about “the social construction of reality” with Granovetter’s interpersonal network concept by arguing that such networks play particularly important roles in the early creation and structuring of industries.

³⁰ For an extended presentation of the research program, see interview with Granovetter in Swedberg: “Economics and Sociology: On Redefining Their Boundaries. Conversations with Economists and Sociologists”, 1990)

³¹ This is a preliminary report on a larger research project by the three authors, denoted: “The Social Construction of Industry: Human Agency in the Development, Diffusion, and Institutionalization of the Electric Utility Industry”, a book which I believe is still forthcoming at Cambridge University Press, New York. The entire project covers a period from the late 1870s to the 1920s, where the article that I am going to discuss, is a preliminary report on the early period until around 1892-95. Another presentation by Granovetter and McGuire is found in Callon (1998).

Having reached an institutionalized stage, the authors also argue that the electricity industry became “locked in”. The “lock in” or “path dependency” concept might be seen as a third master concept and is taken from the path dependency theory of economists like Arthur (1989), David (1986) and Bunn (David and Bunn, 1987). Their reference to the path dependency theory however, needs a bit further clarification.

In the following, I will discuss some of their major theoretical arguments in some detail before I go on to show that their descriptions, explanations and research strategy are in fact fairly close to the actor-network approach and concepts that I have presented. What we may denote their “implicit” network concept focuses differences in purpose/program more than interpersonal relations per se. They also devote substantial importance to non-human relational systems like networks of firms, of financial contracts, of debts, of technologies, of manufacturing plants etc. in their explanations, which points directly at core ANT concepts based on a research strategy which we in short-hand writing may call a “following the networks” approach. The case may thereby serve to demonstrate a theoretical and methodological approach to a study of large scale shaping of industries and economies which can serve much as a model for my own investigation.

3.1 “The Edison case”

The authors argue that the formation of the early electricity industry was not a necessary consequence of inherent technological and economic forces as argued for instance by Thomas Hughes (Hughes, 1983³²). Nor can it be seen as the efficient outcome of a market selection process in which the more economically efficient alternative became selected. They argue that on the contrary, the outcome was essentially open between two conceptually different rival alternatives, where a major reason for the success of the winner was not its profitability but the tremendous debt burdens it had created through out the new industry. The model favored by the financial investors; the isolated plant technology which could be sold to the many small consumption units through out the economy, became forced aside by a network of actors associated with Thomas Edison’s central station technology based on electric network distribution systems. As such the early formation of the electricity industry represents a critical test of the functional market selection argument in neo-institutional economics.

³² Hughes’ argument can only partly be seen as a mechanical cause argument. His empirical analysis also presents a number of constructivist arguments.

One might object to their arguments on the ground that there certainly are important economies of scale involved in thermal power generation due to fundamental thermodynamic laws. The recognition of such as well as of other scale advantages is very likely to have played an important role in the process despite the absence of short run profits, by providing powerful arguments to gain huge long term financial support from Europe (M-G-S, 1993:230-233). I find that the economic efficiency argument should not be rejected all together, as it may play a somewhat different role than the one argued against by the authors.

The article by M-G-S outlines a both rich and nicely dense presentation of a large scale *making of an industry process* which reveals quite a few promising contributions to a theory about *the construction of an industry*. Their discussion of the Edison case is explicitly tied on to Granovetter's interpersonal network theory. The empirical account of the networks involved in the rivalry over how the new industry was going to be structured, turns out to be quite consistent with the concept of entrepreneurial collectives that are hold together by their common "visions about the future" and their "aggregated chains of durable loads". The authors write:

"The friction between Edison and bankers such as J.P. Morgan continued (...) on account of their differing conceptions of the basic trajectory of the electrical generation business. Edison's vision of the industry was that it would consist of utility companies that could compete with natural gas by building central generating stations and selling electricity to individual residents and business establishments."

And on the other side:

"The major American investors in electrical development sought a decentralized system in which residential and individual users would generate their own electricity, using small devices bought from manufacturers and installed (like furnaces) into their buildings.(...) They sought to assign their patent rights to manufacturers and collect licensing fees. Their ultimate ambition was an industry composed of scores of manufacturers, each producing its own line of electricity production and distribution equipment based on Edison patents, for untold numbers of homes and factories." (p. 218)

The relevant distinction between the two rival networks is identified in terms of their different visions about a future end and the different trajectories which would lead to these ends. The authors also indicate that the opponents

were in fact interpersonally related. They were related within the same firm as well as within its executive committee. Hence, interpersonal relations isolated from their affiliation with specific purpose is obviously irrelevant as demarcation criteria between the rival networks. The interpersonal network concept applied in this simplistic sense, fails to provide input to or adequate framing of the content of rivalry between the two networks associated with T. Edison and J. P. Morgan respectively, where as the empirical description is in fact a description of two rival entrepreneurial collectives in the actor-network sense. Hence, the concept of social network applied by the authors is a more complex one in line with the idea of “endogenously defined networks of actors” as I have shortly discussed it in relation to Granovetter’s 1973 article.

Another conceptual problem is encountered when the authors argue that a great number of non-human conceptually structured systems, networks and interdependencies, like networks of firms or of institutions, systems of contractual arrangements, systems hold together by financial debt, networks of local utilities built around central-station technology, interdependence between electric manufacturing plants and electric utilities etc. decided upon the outcome. All of these inter-relational systems lack a methodological account of their relations to interpersonal networks. Their explanations about how an interpersonal network structure may be transformed into an institutionally structured industry, thereby appears to be “on the outside” of the interpersonal network concept.

3.1.1 The path dependency theory. An economic efficiency or a power account?

M-G-S argue that the roles of human agency and collective action are critical, but only within sharply defined historical and structural constraints. This contains the important argument that history must be taken as a given to those engaged in re-constructing society – that historical outcomes represents the only possible point of departure, and another argument that pre-given structural constraints exert important influences on present and future reconstruction processes. These pre-given structures apparently represents what we in the actor-network language would call “stabilized aggregated elements of power”. When describing the new formation of the industry, they go on to argue:

“We mean to identify the forces that moved the industry in certain directions, and the advantages that those directions achieved simply by virtue of having been established; these advantages then changed the nature of the contest between industrial forms in such a way as eventually to lock in a form that might not have been abstractly

optimal. The new form then itself modified the environment in ways compatible with its needs. Later observers, who then look only at a snapshot of technology and organization, may note the fit between industry and environment and find confirmation for their argument that the industry has arisen in its present form in order to meet the needs posed by that environment. Only a dynamic, historical account can break through the misconceptions that result from confining analysis to comparative statics.

Our argument has a family resemblance to that made by economists Paul David (1986) and Brian Arthur (1989), on the “lock-in” of inefficient technologies (...), but generalizes the argument from the case of technology to that of institutional and organizational form” (p. 216)

Interesting to note here, is their pointing at formative “forces” which are found to direct developments in a specific direction. There is also the idea that “advantages and a new form” which have become reality from the efforts of these forces, play important *additional roles* in both locking in and strengthening the further process of expansion by *transforming* their environments. This indicates that the explanatory capacities of those constructed elements are related to the expansion of the common project of those who turned them into reality in the first place. *They have become part of the network in an explanatory sense.* The argument is completely consistent with the explanatory role of non-human elements that are somehow related to acting collectives in actor-network theory.

Secondly, there is an argument that forces somehow grow through the formation of additional elements and through the capacity of these to transform new elements of their environments. This points in the direction of a *power argument as fundamental to their path dependency theory*, rather than an economic efficiency argument. This power has to do with the capacity of the network to expand through incorporating elements of its environment which originally are “on the outside” of it. It points at some *dynamic concept of power* rather than a “static” concept traditionally used within sociology – which is typically seen as pre-given, stable and attached to the existence of given categories of interests, institutions, humans etc. Such a dynamic concept of power may provide an entrance to investigating into the relationship between path dependency and radical transformation.

The theory of David, Arthur and Bunn about path dependency in technological adaptations, is focused on the analysis of systems taken to have economic increasing returns over time. The basic explanatory argument

rests primarily on an *economic efficiency or profitability argument* rather than some type of power argument.

Increasing returns has two well known properties in economic theory. One is non-predictability in terms of which outcome will be selected, and the other is potential inefficiency caused by the possibility for potentially more efficient alternatives to be locked out at an early stage. Additionally, Arthur (1989) shows that increasing returns provides for inflexibility in the sense that a given solution gets increasingly more locked in, and non-ergodicity, which contains the result that small events might not be “averaged away and forgotten”, but may decide the selection of the outcome. The idea that technological systems have increasing returns provides the system which due to some minor event “happens” to get adopted, with an economic advantage compared to any other competing technological system. Because of the ability to improve on the adopted system and to adopt it specifically to the circumstances that it counters in reality, the established system will increase its efficiency over time and accordingly increase its relative competitiveness in relation to its rivals. The more adopted it gets, the more experience is generated with it and the more the system is improved and efficiently adjusted to the complexity of everyday activities and needs and the more costly it will be to oppose it or to circumvent it. But, because potentially more efficient systems are locked out at an early stage, the outcome is potentially inefficient in a global sense.

This economic efficiency argument can of course also be applied to a discussion of increasing returns in institutional adaptation as suggested by M-G-S. The problem involved does not seem to be the efficiency argument per se, but rather the explanatory capability that it provides. Increasing returns seems to provide the efficiency argument with a limited ability to explain the initial lock-in-making, which is taken to be unpredictable or merely accidental. Rather, it suggests that economic efficiency and profitability are primarily generated and revealed along the way, that they are outcomes rather than present from the beginning. Arthur, Bunn and David also seem to argue that whatever is not “of reality”, becomes relatively less efficient over time than what is of reality, and that this efficiency advantage can explain the lock-in effect over time. This raises questions to how radical change may occur in the presence of path dependency. How can non-existing alternatives suddenly overturn existing? What is involved in the de-locking which is apparently needed to facilitate radical change?

M-G-S are not really clear about whether they lean on the economic argument or some type of power argument that I have pointed at, or rather on a more holistic account which draws on a range of different arguments. But

it seems to me that what can be extracted from their empirical descriptions and explanations is largely congruent with a power-conception of path dependency. The establishing of a lock-in may be seen as an outcome of construction of power (or “irrefutable structures” in the terminology of M-G-S) – of new powers, or as an outcome of association with and transformation of established systems of power to fit into and to dominate a new area and thereby prevent rivals from doing the same. Increasing economic returns may then follow fundamentally from the establishing of domination of power. To reconstruct an industry – or to overturn an historical lock-in – would then have to do with the breakdown of established power systems and the creation of new ones – in which demonstration of future economic efficiency might be a crucial element.

3.2 Discussion of analytical concepts

In the following, I will discuss a number of actor-network analytical concepts in the context of the analysis presented by McGuire, Granovetter and Schwartz and also search out additional analytical concepts and theoretical arguments relevant to my analysis of the Norwegian electricity market reform.

3.2.1 A dynamic concept of power and the concept of and role of a “representation”

A dynamic concept of power is not formulated by M-G-S. They explicitly offer a concept of power as something pre-given, which at least in part is at odds with the empirical descriptions and explanations they present, like in the following quote:

“We believe that the resulting structure was not the only technologically practical one, nor was it the most efficient in terms of market economics. It arose because a set of powerful actors gained access to certain techniques and applied them in a highly visible and profitable way. (p. 215)³³

What is pointed at by the authors, is the idea that those human actors who came to decide upon the outcome were powerful at the outset – before they gained access to certain techniques and before they applied them in specific ways, not that they engaged in constructing new powers or in increasing

³³ My underlining

their powers by linking together elements which represented additional power elements. My questions to this would be: Can we really separate the powers of the actors from the techniques to which they “gained access”? Can we separate their powers from the elements which were involved in their shaping of their industrial project? It seems to me that the authors at least implicitly argue for an alternative and more dynamic concept of power when they continue:

“Those techniques resulted from the specific and shared personal understandings, social connections, organizational conditions, and historical opportunities available to these actors. This success, in turn, triggered important pressures for uniformity across regions³⁴, even when such uniformity excluded viable and possibly efficient existing or potential alternative technologies and organizational forms.” (p. 215-216)

The techniques involved were apparently parts of a more general *power system*, whose “success triggered important pressures for uniformity across regions”. Rather than arguing that change followed simply from pre-existing powers, they argue that by creating an initial success, the network added further elements to its “pressures for conformity”. That is, power of transformation is part of what is being constructed along the way and provides input to explanations about the expansion process.

Another type of question would be: Why was visibility important and how come the applied techniques were “highly” profitable as argued by the authors in the above quote, if they were not market efficient as is their general argument? I think it follows from the presentation that visibility was important because it was intended to increase the persuasiveness of Edison’s argument towards financial investors that the future was in the central station technology rather than the on-site technology. Visibility, accordingly, had to do with the construction of a powerful (persuasive) “representation” of the vision. In the Edison case, this refers in particular to his construction of the Pearl Street central station system at Manhattan New York. We may thus infer that a dynamic concept of power may contain constructed representations of a program – semi-ontological phenomena - which add powers to the entrepreneurial collective.

To demonstrate profitability obviously served a similar purpose. But here, the authors seem to mix together the concept of realized short term

³⁴ My underlining

profitability and the concept of expected future profitability in a way which confuses the argument. To construct visible and profitable *representations of the future* appears to have been an important part in Edison's building of a capacity to create a *breakthrough* into a position from where he and his network could shape the new industry. As it turned out, Edison could not demonstrate immediate profitability from his representative power plant, where as the alternative; the on-site technology, obviously could. Demonstration of profitability in this particular short term sense does not explain the resulting industrial structure as apparently claimed by the authors in the quote above. This is clearly demonstrated through out the text. Edison failed in persuading American investment bankers to support his ideas because they were focused on short term, low risk returns to investment, and accordingly rejected a project which required massive long term investments with nearly no share of the risk allocated to the consumer side. His large scale, long term and risky project did simply not fit with the financial strategy of American investment bankers at the time. This nearly caused a severe breakdown of power for the entire project. Hence, the failure of representations to "pass real world market tests" as represented for instance by the financial market, may seriously break down the aggregated powers of entrepreneurial collectives. What turned out to be Edison's rescue, was his access to another large network of actors with huge financial resources in Europe – before profitability could be demonstrated. This occurred presumably on the basis of shared beliefs in the visions offered by the central station technology, its theoretical underpinnings, expected future profits and the Pearl Street representation of the system. Hence, to European institutional investors with a longer time perspective and strategy, Edison's profitability argument³⁵ probably appeared sound enough.

As I read it, his project became rescued by someone largely at the outside of his own overview and control; German financial institutions headed by Deutsche Bank, who embarked on Edison's project presumably in order to ripe the new and rapidly growing electricity sector from their American rivals. The entire Edison-central station network came to play a powerful role in a different game, which came to decide upon the outcome. The European financial network added financial powers to Edison's technological network, where as the Edison network added technological powers to the project of the European financiers. A dynamic concept of power accordingly, needs to account for such mutual integration of powers of networks with different but relatively consistent purposes.

³⁵ It was really Henry Villard who managed to raise a European financial consortium to support Edison's project (McGuire, Granovetter & Schwartz, 1993.230-233)

M-G-S thus offer input to a concept of power which is based on the aggregation of elements of power within self-designated networks. The adding of “successful” elements are needed to produce a necessary breakthrough into an area of the economy and to expand the project represented by the network. The failure of important power-elements on the other hand, leads to a reduction of aggregated powers, and may obviously in crucial cases even lead to a breakdown of the entire power system, in which case the network will not be able to achieve its objectives.

3.2.2 The concept of a program; its core and its associated “rules and roles of the game” model

In line with the actor-network approach, the content of meaning and purpose can be conceptualized in the form of a “program for change” which defines the uniqueness of a network such as the “Edison network” or the “Morgan network”. I find that “program” is a better concept than “truth” which is used by Bromley in a similar conceptualization (Bromley, 1998), because it incorporates notions such as identity, truth, rationality, interests, objectives, purpose and vision. It is commonly used to describe the content of political parties or other organizations that have specific changes in society or in organizations on their agenda – a representation of shared opinions about some preferred future state and about how to achieve them. Different programs which refer to the same phenomena in society, will then constitute rival collectives.

If we turn to the structural aspect of a program such as Edison’s “central station program”, it can be separated into a *core*, which represents the unique and stable idea or concept of the program; the central station system, and a surrounding related model which could be described as a “*rules and roles of the game model*”. M-G-S touches upon these models when they elaborate over the fundamental causes of the conflict:

“The crucial fact is that the main point of contention between Morgan and Edison was not the technology as such, but rather the structure of markets and economic returns that would result.” (...) What was crucial was that Edison sought to sell electricity in a way that required massive investor capital and little economic outlay from the consumer. Morgan wanted to see equipment sold to consumers with minimal outlay from EELC investors, as would happen if licenses were sold to producers who risked their own capital and paid royalties to EELC rather than such risks being borne by EELC investor funds.” (p. 219)

While a technological-economic concept defined the identity - the core - of each program, the surrounding model defined the perceived distribution of powers and economic returns affiliated with each program. These represented the basic content of the controversy. To identify the various models of “the rules and roles of the game” that are involved in industrial reform processes, should accordingly an important focal point for the analysis.

3.2.3 The explanatory roles of non-human networks, interdependencies and delegates

McGuire, Granovetter and Schwartz use a historical sequence of events to demonstrate how an industry is being created through the construction of different types of networks and interdependencies that are related through the specific roles they are given by the enunciators of a specific program. They describe a carefully and strategically constructed system where every entity has its unique role, and where the various elements can be seen as representing a fraction of the entire “collective” thing which constructs and shapes the new industry and enrolls elements of its environment to become consistent with its own shapes and structures.

When searching for possible explanations for the eventual domination of the central station system over the isolated plant alternative, M-G-S engage in describing these networks, systems and interdependencies and the specific roles they played. To exemplify matters, let me start by quoting from their discussion about the technological “network” system:

“In developing his incandescent bulb, Edison turned away from low-resistance, high-current lights that others had experimented with because his calculations showed that central stations would have to use fantastic amounts of copper wire in order to connect up any substantial area lighted in this way. Instead, he turned to the high-resistance, low current model that he eventually made to succeed. He also developed new kinds of generators (then called “dynamos”) that could drive such a system. From the very outset of his work, Edison was guided by this overarching concept of a whole electric distribution system of which all the parts must be fitted into place. In contrast with other inventors who searched only for some magical incandescing substance, he worked out all the supporting structure of his system; its power supply, conductors and circuit, and then came back to determine what kind of light would be demanded by it” (Josephson 1959:211) (p. 220)

Technology-making obviously played a vital role. It created a representation of Edison's vision as well as a network system where each part represented a node specifically related to other nodes. Each point as well as the whole was also related to specific institutional arrangements which defined property rights, patent rights etc. They were also related to specific organizations like Edison's laboratories and manufacturing plants, to engineers working at these sites and to what might be called Edison's financial system or - network. Technology represents one type of related network which both defines elements of the collective and holds it together.

The role of Edison's laboratories is also described as a very essential part of the system:

"Edison had never been the solitary inventor working in his late night laboratory. Francis Jehl, who had worked there described the Menlo Park operations thus: "Edison is really a collective noun and means the work of many men" (quoted in Lindgren 1979:17). From sometime in the early 1870's, when his lab in Newark, through the legendary Menlo Park period (1876-1881), when so many important technological breakthroughs took place, Edison employed about 200 inventors and technicians. After the move to New York, when the laboratory on Goerck Street guided the success of the Pearl Street station, at least 200 (and possibly perhaps as many as 500) additional employees passed through the Edison laboratories. These individuals, most of them inventors and tinkerers, became the heart of electrical manufacturing and generation in the United States. Many were promoted internally, so that most of the executives of the various Edison manufacturing companies (...) rose from the laboratory. (p. 224)

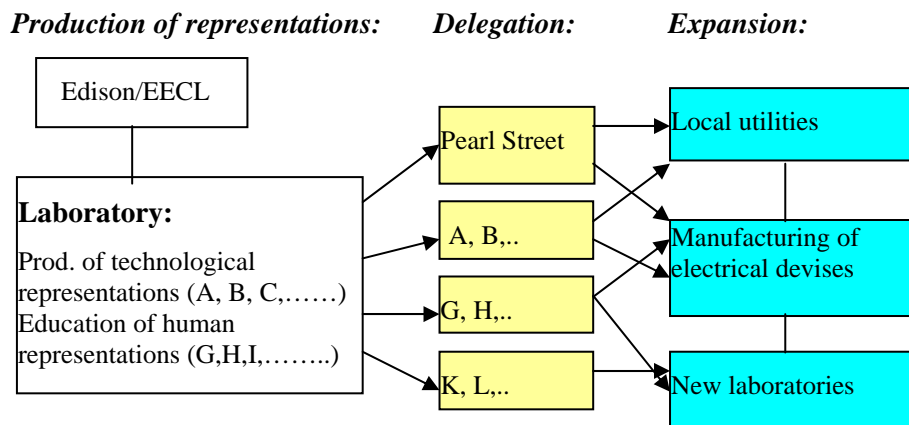
The expansion of the central station system is here argued to have been a collective enterprise through which numerous engineers were trained and skilled as well as were contributing to the innovation activities within the framework of Edison's large project. The expansion of the central station alternative came to rest with a process of *delegation* to these men, who through the laboratories grew into advanced *representations or delegates* of Edison's visionary program as well as to become important nodes in his expanding network.

The role of the Edison laboratory was accordingly not only to invent new devices. It was also to associate with talented engineers and to transform them into qualified representations of the vision, who could be *trusted* to take on large delegated responsibilities. Trust in this sense, was largely a function of processes of *translation* where those to be trusted became

representations of the program – of shared understandings within the network. *The laboratory accordingly represented a body of structures and activities which formatted both human and non-human elements to play specific roles within the expanding collective.*

What we see here, is not an expansionary process which is driven by economic superiority or some abstract impersonal pressures in society. It is a process driven by a dedicated production of human as well as non-human networks which constitute a grand construction of industry project. It appears that in order to explain large scale radical changes in society, we will have also to trace *the system which produces qualified representations of the core of the collective.* A simple illustration of the Edison system is provided in figure 3.1. below.

Figure 3.1. Production of representations for expansion through a process of delegation



M-G-S continue their article by presenting some of the most important associates of Edison, the companies they took responsibility for and the various economic arrangements between Edison and these men. The various companies typically obtained exclusive licenses from EELC to produce certain devices to the central station system as well as investment capital. Individuals who had contributed with important inventions, were given shares in their future revenues. These constructions formed interrelated *networks of firms* and of *economic contracts*, which added to the technological and the interpersonal network systems. They all played their important roles in transforming Edison's vision into reality. Even though the interpersonal relations obviously were important, the other networks were virtually inseparable from the interpersonal, and the powers of the

relationships within the entire “empire” obviously followed from the aggregated strength of the multiple types of relations, and not primarily from anyone particular of them.

3.2.4 The concept of a lock-in creation through a decisive breakthrough

McGuire, Granovetter and Schwartz demonstrate in substantial detail how Edison gradually through strategic actions managed to create a lock-in situation in which his central station system became irrefutable. This resulted in particular from his establishing of strong commitments and dependencies within his system in the form of financial debt and share issuance in lieu of cash payments, a centralized manufacturing system, an integrated technological system with patented protection on each part and a dominating influence on the community of electrical engineers – in short: the aggregated power system he and his collective had constructed to turn his vision into reality.

After having constructed the Pearl Street representation and an industrial system to produce all his devices, Edison responded to the shunning by investors from his plan, with a decision to push the expansion process himself. In the spring of 1883, he established the Thomas A. Edison Construction Department to sell and build central stations, and put the 23 years old Englishman Samuel Insull, who had become engaged as his personal secretary, in charge of it. During 1883 and 1884, he and Insull sold a number of central station systems to a variety of small towns. M-G-S note that:

“What was most significant about these sales was that Edison accepted securities of these firms in lieu of cash payment for equipment and for the EELC license. This further angered EELC investors, who received, instead of cash, securities for where there was no market, and upon which there would not be dividends in the foreseeable future given the absence of any substantial cash flow. This practice also worsened Edison’s own economic position by requiring that he cover the immediate costs of manufacturing equipment for these stations – a further drain on his limited capital supply. (...) the indebtedness of local utilities to the Edison Company – particularly the equity aspect of this indebtedness – created a long-term partnership between them that ultimately established both coordination and control across the market.” (p. 127-128)

This ability to coordinate and control across markets appears to be the immediate result of an industrial lock-in by constructed powers which over time facilitated path dependency.

Institutional and organizational control was an essential part of this game. The struggle for control over the EELC became a major focus of the rivalry between the Edison and the Morgan collectives. To the entire conflict, property rights to the patent owning entity – the EECL - represented the essential institution which had to be controlled in order to direct the entire system and to control the revenues. It was – so to speak – the *commanding height* of the battleground.

The battle switched from side to side and appeared to be completely open. Both parties mobilized the powers of their related networks and engaged in expanding them through the creation of new alliances. Thus, there was an escalation of “arms” on both sides which increased the amount of powers constructed as well as mobilized to overthrow the opponent. The eventual outcome appeared to depend on who was capable of constructing and mobilizing the most powerful aggregation of forces relevant to the fight in order to force through his program.

In the end - in 1891 - after 12 years of intense rivalry, Morgan managed to take over complete control with a re-structured Edison General Electric Company (EGEC) through a merger with one of its major competitors; the Thomson Houston Company. By this event Edison left the electricity industry entirely and the EGEC shifted its name to General Electric Company (GEC). Morgan then made a final attempt to re-emphasize isolated power at the expense of central station development, but eventually had to give in after a series of bankruptcies between 1894 and 1896 for central stations in which the GEC had major stakes.

Morgan gave in and abandoned his vision about an electric industry structured on the basis of isolated on site production units sold to the many millions of households and businesses, and turned his attention into rescuing his own financial position by promoting Edison’s vision while obstructing his own. Even though Edison personally lost the battle and disconnected himself from his network, the collective which had been constructed from his vision, won completely. From the mid-1890s, enormous amounts of capital became invested into the central-station business world wide, including vast resources to research and development in order to overcome technological difficulties and improve technological and economic efficiency, where as nearly nothing went into developing small scale technologies. We have to go all the way up to the late 1970’s and 1980’s before any new significant interest in small scale production reemerge – this

time not as isolated entities but as connected to an integrated into central station system with advanced operational and control systems, often in combination with local heat distribution.

It appears that the establishing of a European consortium to support Edison's expansionary project in 1889 represented the actual *breakthrough* event by which the Edison collective established a solid basis for dominating further developments. It also seems to me that somehow to produce such a breakthrough, provides the opportunity to create a lock-in situation. This does not imply that the program could not have been broken down by its rivals or by its own failure to pass some "real-life tests" after such a breakthrough event. Rather it suggests that a breakthrough provides the program with a unique opportunity to adjust institutions, restructure the field, construct interlocking directorates, redirect economic resources, expand its system of production of trusted delegates, technologies and manufacturing and consolidating them. To investigate radical industrial reforms, accordingly involves the investigation into how breakthroughs and lock-ins are created and maintained.

I think McGuire, Granovetter and Schwartz argue rather convincingly that the outcome at least until 1889 was fairly open and that Morgan's alternative technology was feasible at the time. It was economically more profitable, more reliable, more energy efficient, easier to operate and contained less technological problems. In the longer perspective however, it is difficult to see the option that large scale central station technologies would not have been developed – due to the technical economies of scale involved. A delay however, may have provided a more balanced development as for instance small scale combined heat and power distribution systems, which may have been developed to take advantage of short distribution distances while maintaining relatively high energy efficiency levels at reasonable costs³⁶.

I also find that their explanation of the outcome of the rivalry, presented by M-G-S at the end of their paper, is convincing: Morgan found the central-station approach irreversible, because the *structural circumstances which had been produced* during the 12 years of relative autonomy during which Edison, Insull and their affiliates first developed central-station technology and then created a network of utilities based on it, were irreversible. These "circumstances" included the wide spread system of local utilities which prevented Morgan from realizing his own vision within these areas. It

³⁶ For instance on the basis of the Stirling engine constructed in 1816, which is now into a revival.

included the highly centralized manufacturing sector which produced the full range of products needed. This undermined the basis for a multitude of small sized, specialized, licensed producers favored by Morgan, and it included the interdependency between the centralized manufacturing system and the local utilities (p.234). These “constructed structural circumstances” were nothing but the various network systems constructed by the Edison collective.

To create a lock in, accordingly contains the construction of a *persuasive system of power* to support the given program, the capturing of *relevant commanding heights*, the creation of a *breakthrough* and the expansion of interlocking *coordination and control arrangements*.

3.2.5 The concept of real-life testing of remaking of the economy projects

From the analysis presented by M-G-S, it seems to me that profitability or “economic gain” holds an important role in what we may call the “real-life testing of rival remaking of the economy projects”. There were many ways by which the Edison vision could have failed to dominate the structuring of the new industry. But, it seems to me that the ability of the Edison collective to obtain financial support and later on to force a financial support for its system, constituted the major content of the real world test which the project had to pass. In this respect, the role of financial resources was essential.

The highly strategic capital boycott organized by Morgan, could have caused a breakdown of the system embedded in Edison’s collective. That is, a strategic act by the rival collective. But, the Edison project could have failed also for technological reasons. A similar attempt at constructing two central station projects initiated by the talented inventor and investor S.Z. Ferranti, in London in the late 1880’s, turned out to be a miserable and extremely costly failure which caused a set back for the central station vision in England for more than 20 years. And, for sure, the Pearl Street project was not a completely convincing demonstration of technological superiority either. Mainly caused by technological problems, it appears to have nearly ended in a technological and financial failure.

The case also demonstrates how a breakthrough for one of the rival collectives simultaneously produced a *dissolution of the powers associated with the alternative program*, whose representatives in the end were transformed into the collective of the winner. The major weak point in the Morgan collective appears to have been its lack of an alternative inventor with the charisma, creativity and willpower of Edison and his affiliates, and the fact that they had invested large sums into the Edison venture, with an ambition to redirect Edison’s efforts by translating him into their own

program. When this did not succeed, Morgan could not find an alternative source for the capabilities mainly held by Edison.

The general learning from this may be that programs which manage to create a decisive breakthrough and thereby to create an initial lock-in, will have to pass through a series of real-life tests, ranging from financial tests and market tests to the overcoming of strategic efforts by rival collectives to regain control over essential “commanding heights”. The stability of the new structure can accordingly not be taken for granted, but will have to be maintained by all those networks that are holding specific roles within the system.

I also find that the authors’ pointing at the significance of early events is an important point – which should lead us to be very serious about investigating the historical roots of economic sectors which became objects for large scale reforms later on. This should not lead us to believe that these early events prohibit radical reforms – only that the aggregated powers represented by the reformers will have to be substantial in order to overturn the locked-in powers of such established historical collectives.

3.3 *Final comments*

With these comments, I think I am able to conclude that to expand the theory of social networks to a theory of entrepreneurial collectives in line with the actor-network approach, offers theoretical concepts by which we can address the problem of radical change in sectors of the economy that are institutionally and technologically locked-in, in illuminating and conceptually consistent ways. The expanded network theory includes non-human networks, systems and interdependencies that are important explanatory elements, but which remain exogenous to the social network theory in the analysis by M-G-S. The extended network concept may also include political, cultural, cognitive or theoretical elements like beliefs, ideologies, taken for granted assumptions, rule systems, economic or sociological models etc. These are tied on to historical or entrepreneurial collectives structured around programs with specific political, cultural, cognitive or theoretical content. It may contain models of politics, social preconditions for economic institutions etc. The concepts presented - I think - permit us to begin investigating into how actors construct their worlds and how they may reconstruct aspects of society on the basis of new concepts – to respond to Fligstein and Mara-Drita’s critique of the social network theory.

Finally, I have shown that the analysis of the early formation of the American electricity industry as presented by M-G-S, does contain a number of analytical concepts and theoretical arguments which are fairly congruent with the actor-network approach, as well as a number of other useful concepts and theoretical insights. These provide additional methodological tools to my investigation into the Norwegian electricity market reform. I find that their research strategy, which is to follow what I have denoted entrepreneurial collectives through their controversies, projects and networking activities from early conceptualizations through networking, constructions of representations, breakthroughs, expansions through delegations and finally stabilization, offers a useful model also for an investigation into the Norwegian electricity market reform process.

This concludes the up-front discussion of theoretical perspectives and analytical concepts. The rest will have to be derived from empirical investigations into the Norwegian electricity market reform and the history of the electricity sector. Before entering the historical analysis however, I will make a few short notes about research strategy and methods in chapter 4, which concludes this first part of the discussion.

4 Operational research strategy and methods

The point of departure for this study is a desire to explain the remaking of a large economic sector of society through radical regulatory reform, to understand the process of change, the forces which caused the sequences of events and the forces which had to be managed and overcome in order to establish the new order, the transformation of the sector and the stabilization of the new system over time. The ambition is to outline the causal explanations represented for instance by the conceptualizations, the programs, the actions and the negotiations among those involved in the remaking of the electricity sector economic system, which implies that the analysis will be concerned with investigating into the relevant sequences of events over time as well as into the origins of and the “directions of” the activities involved.

The research strategy is similar to a single case study in that it aims at exploring a unified area of activity for the purpose of analytic generalization as opposed to statistical generalization. Apart from explaining the market reform process, its ambition is to explore theories, methodologies and analytical constructs in order to judge their appropriateness and fruitfulness in relation to the study of large scale economic change. And, eventually, it is to refine them with pieces of additional analytic generalizations based on insights obtained from the study. There is probably a deeper concern with history in this study however, than what is usually found in case studies (Yin, 1984:22).

The case also offers a number of sub-cases at different analytical levels. At the level of large scale economic reform, the history of the electricity industry offers quite a few interesting examples, where as more parallel sub-cases are offered at more detailed levels of investigation. This is not interesting because it permits us to collect a sample of change processes for the purpose of statistical generalization. It is interesting because it offers opportunities for an implicit multiple case study in which theory and analytical constructs can be tested on multiple cases.

The fundamental approach is exploratory in two different ways. First, it explores into theory and analytical concepts to find appropriate theoretical perspectives and analytical concepts to both frame the study, focus the attention on the essential issues, capture the essence of what is to be explained and “move around” in the “messy” field of empirical investigation. Second, it explores the value of these analytical concepts in describing historical and contemporary events obtained from empirical investigations. In this sense, the exploratory study “shifts” into a descriptive

study where descriptions are partly interwoven with the analytical constructs which have been presented. Explanations and theory testing result from taking these descriptions further into critical examination and judgement. The entire process could perhaps be seen as a process of *explanation building* (Yin, 1984:113), which takes as its starting point that any explanation requires both appropriate analytical concepts, analytic generalizations, empirical content and critical reflection to constitute what we take as a convincing scientific explanation.

The research strategy suggested by the actor-network approach is to follow human and non-human networks in their actual making and remaking of society. This has similarities with the research strategy explored by McGuire, Granovetter and Schwartz: To investigate the different types of networks involved in “the social construction” of the new electricity industry from their origins through their investigations and projects. Explanations follow as extensions from the descriptions presented. That is, explanations will have to be rooted in descriptions of collectives (or circulating references) and their main collective things, their efforts to expand their programs and their building of technological, institutional and human structures seen as durable systems for power of domination.

While the basic unit of explanation is the change process in large, the operational units of investigation are collectives/actor networks/circulating references at different points of analysis; from the extended collectives of economic schools of thought to individuals, specific technologies, research institutions and state administrative offices.

The strategy implies a focus on identifying the dominant actors within the field of study, to identify their core economic concepts, their anchoring in more extended network systems including institutional positions from where they set out to analyze and to reshape the economy. It similarly implies a focus on identifying the dominant enunciators of rival programs and entrepreneurial collectives, their political-sociological theories and “world models”, their constructions of durable systems of power, their efforts at turning down, transforming and negotiating solutions with their rivals and possibly their major breakthroughs into new areas of the economy. It implies a focus on the rivalry between expanding entrepreneurial collectives and established historical collectives which have already managed to incorporate, transform and dominate institutional-organizational-technological structures within the given sector, and it implies a focus on the rivalry between collectives which aim at capturing the given sector of the economy at the same time.

The argument about the significance of early events points at the need to start the analysis with an historical presentation of the Norwegian electricity sector with a focus on major historical remaking of the sector processes – whether successful or not. The historical analysis will provide a description of the established stabilized industrial system which made up the point of departure for the market reform process. It will also serve to present the historical collectives which had to be overturned by the reformers as well as rival collectives which aimed at reforming the industry in accordance with quite different ideas.

At the outset, I recognize that the complexity of my topic is large. This implies that no simple economic-sociological explanatory theory is likely to exist from which operational hypothesis could be derived and tested in a straight forward manner. Or at least, I know of no such convincing theory. But, as indicated through this introductory chapter, I find that there are promising theories which represent starting points for the empirical analysis and which provide fairly powerful implications for the research strategy as well as for the explanatory approach. So, this is a kind of “grounded theory” project á la Glaser & Strauss (1967) in which middle range theories can be extracted from the iteration between clarified analytical concepts, higher order theoretical propositions and empirical observations - starting from a chosen analytical position and perspective. Basically, however, it leans itself to the basic insight of ethnomethodology; that the actors that I am concerned with are expected to know what they do and why and how they do it – and that they know much more about it than I will ever do – because they were the ones who did it. My objective is not to reveal some hidden underlying explanatory force which may be said to explain the reform process to them, but to conceptualize and theorize on the basis of representations of their re-making of an industry activities. Neither is it to explain their reasons or their behaviors – only to identify what makes them able to find their ways through each other’s economy and industry re-constructing activities.

The great complexity of the phenomenon has in part to do with the many different perspectives one could obtain from where different observations could have been presented in unlimited detail. It would be far beyond the resource constraints of the project to present a description of and an explanation about the Norwegian electricity reform in any *complete* sense. The scope by necessity has to be more limited, and a number of possibly important events, links and influences will have to be left for others to explore. On the other hand, I will also be drawing on substantial research by a few others who have investigated into the history, the concepts of and the outcomes of the electricity market reform. In this respect, I hope to be able to add elements to a broader research on the subject.

4.1 *The role of the analyzer in providing valid explanations*

The dependency of scientific explanations on scientific theories and methods should be recognized as a basic condition for the provision of explanations about empirical phenomena. Describing and explaining observed phenomena can accordingly only be done from a position within some scientific actor-network where a specific perspective, analytical constructs and methods of investigation have been stabilized within some research program. Only when there is such a basis, the actors and the objects they act upon can be observed, described and explained in a scientifically meaningful way. The purpose of this first part of the study is to present such a stable “scientific actor-network”.

In accordance with Robert Delorme’s theory of complexity (Delorme, 1995), there is a possibility for analyzers to “incorporate” different schools of thought by reverting to a higher level of observation (which must of course be scientifically stabilized as well), where the analyzer escapes from the logical constraints of the subordinated level of observation and theorizing. From such a position the analyzer is free to shift his focus and obtain descriptions from different schools of thought as well as from different actors involved in the process specifically in focus. “We can only obtain explanation by triangulating the many points of view of actors. It is thus critical to be able to shift easily from one observer to another” (Latour, 1991:124). On the other hand, the analyzer is not free to shift arbitrarily between different levels of observation. The observation-level of triangulation must be fixed – unless he explicitly decides to shift his level of observation and thereby accept the basic logic rules at the level of analysis he enters. Breaking this rule will severely confuse the analysis by breaking generally accepted principles of logic.

It should also be emphasized that descriptions and explanations are dependent on some theoretical position from which you can only escape by evaluating the phenomenon from some other position, which has itself been stabilized by some other actor-network scientific program. There is no “neutral” position outside such “circulating phenomena” from where we can judge the situation. This understanding does not imply a relativist position in which all explanations are seen as equally good, but rather a relationist, which implies that descriptions obtained from the different points of view of engaged and engaging actors, provide substantial possibilities for fine-tuned analysis and rejection of unreasonable interpretations - even at very detailed

levels of analysis. Descriptions and explanations obtained by other analyzers similarly represent important observation for triangulation of perspectives.

4.2 Empirical data

The data generating and processing approach has been to conduct repeated empirical investigations, starting with a few pilot studies and continuing through a number of sub-case investigations in order both to explore theoretical approaches and to collect relevant data. Through an iterative process, different analytical approaches have been explored which have in part shifted the understanding of which data are relevant to collect, and additional empirical findings have triggered the need to check out further theoretical perspectives and analytical concepts and so forth. I have also made extended use of and scrutinized empirical findings and explanations offered by other researchers – such as the two historians Lars Thue and Bjørn Barth Jacobsen who have both addressed the history of the Norwegian electricity sector and the electricity market reform in some detail from different analytical perspectives. I have also been able to draw upon a substantial bulk of research projects at the Center for Electricity Studies at the Norwegian School of Management, research on the Norwegian electricity market by other research institutions, and reports from public institutions.

The strategy has been to collect data from multiple sources in order to establish a chain of evidence on which the discussion of theoretical explanations can be based. This involves triangulation of evidences from sources such as interviews with actors, public documents, research reports, statistical data, participatory observations and public debates in newspapers and industrial journals, as well as triangulation of evidences presented by other researchers.

Multiple source data collection implies a non-routinized procedure where data are collected on the basis of research questions, theoretical generalizations and analytical concepts that are developed and revised along the way, and where the empirical field is permitted to offer new opportunities, new challenges and additional sources of data through the process. It is the very challenging task for the analyzer to collect the evidences in a non-biased manner and to present them in a way consistent with generally accepted scientific standards for analytical relevance and critical reflection. The overall result is a mix of concrete evidence, abstract analytical concepts and a general theoretical perspective.

4.3 *Validity and reliability*

Validation of analytical concepts has turned out to be a particular focus of attention in this study. This involves constructing or collecting analytical concepts that are consistent with the purpose of the study and with the proposed theoretical perspectives and propositions, and which fit to the empirical entities which have to be conceptualized in order to be discussed by the theory. The validity of these concepts will probably have to be judged on the basis of their fruitfulness to additional empirical investigations and explanation building attempts. I have, however, in an effort to increase the validity of my analytical concepts, made extended use of the study of McGuire, Granovetter and Schwarts presented in chapter 3.

I still find that constructs of language such as “actor-network” and “collective” could be improved upon by finding some other concept that provides more accurate associations, but at least I find that they cover those empirical entities that I have been interested in, in a useful way.

Internal validity has also been a major concern. In particular, it has been an ambition to identify and outline the proper character of the causal relationships between the events studied. As a starting point, I have discussed argued that changes in industrial and economic systems follow from the work of and the interaction of entrepreneurial collectives that are somehow established and shaped on the basis of some unifying concepts, purposes and programs regarding a future end. I have also outlined analytical models which permit us to incorporate elements that are traditionally seen as representing “mechanical” forces or causes, into such a “final cause” mode of explanation. One of the objectives of my case study is to investigate further into how certain conditions can be seen as leading to certain other conditions and thereby constitute causal links, without us having to perceive of them as mechanical or deterministic forces.

External validity concerns the domain to which a study’s findings can be generalized. The ambition of my study in this respect is outlined in the introductory chapter and covers the domain of large scale radical economic reforms across the world and across time and the relationship between economics as a scientific discipline and the economy as a societal phenomenon.

In broad, I find that the case studied is representative to this domain, despite the obvious “contextual” differences to other large scale economic change processes in other countries and to historical processes of change in economic systems. The problem would be that there are too many things that are taken for granted when we study our own society, which can not be

taken for granted when we shift to other societies or to different times. This is however, probably one of the major strengths of the actor-network approach; that its analytical constructs escape from the dependency of some outside context taken to shape the entities studied. Rather, it presents a set of analytical concepts which focuses the attention on the changing phenomenon and conceptualizes what constitutes change-making in a fundamental way. Analytical insights obtained from such a focused view might accordingly be transferred into very different historical and geographical “contexts” without losing validity. This generalized applicability is also demonstrated by taking the analytical concepts from the area of science and technology studies and applying them to a process of large scale reform in the organization of an economic system.

I have not found space within this project for a comparative study of similar market reforms in other countries, but have included some discussion of other large economic reforms in Norway which have been studied by others and which represent important preconditions for or influences on the electricity market reform. For obvious reasons, the validation of any conclusions would have been substantially improved with the inclusion of more cases. It is my hope that it may contribute to facilitate later comparisons with different large scale industrial reforms.

Reliability is probably the more difficult part. I have tried to include sufficient references through out the text, but recognize also that more could have been included to demonstrate that the operations of the study can be repeated with the same results if someone else was to fight her way through what I have done. In order to check out the data as well as my interpretations of them, drafts of this manuscript at different stages through the writing process have been distributed to core participants in the electricity market reform for comments. Their critical comments as well as their confirmations represent the second important source of validation.

The basic problem however, is the theory dependency of the analyzer which causes me to draw upon a substantial amount of knowledge and data that are simplified and conceptualized in specific ways and where the origins of the data have become partly obsolete or too complex to trace in each case, but where I still feel confident in their validity. In particular, I feel that the very explorative nature of this piece of research has forced me into a rather aggregated molding of complex empirical data with theoretical perspectives and analytical concepts where the selection of and interpreted data cannot be completely separated from the other ingredients. The context of investigation and explanation cannot be completely separated from the context of justification of analytical apparatus. On the other hand, checking and documenting the sources of data is a matter of scientific importance which

should not be taken lightly, where I constantly feel that I have room for improvements.

Part II:

Historical trajectories and rivalries

Introduction

In this part II of this elaboration I will present a short overview of important historical trajectories and rivalries within and associated with the Norwegian electricity sector in between the 1870s and approximately 1980. The purpose is in part to provide a background picture for later events, and in part to investigate into what may have contributed to or provided the opportunity for a radical market reform collective to emerge and to succeed at the later stage. Is it – in hindsight – possible to trace important roots of the electricity market reform in early historical events – or in the early structural, institutional or economic systems which through history came to constitute the Norwegian electricity sector in unique ways?

In line with the theoretical and methodological approach outlined, I will focus my presentation on those entrepreneurial collectives that engaged in the shaping of the Norwegian electricity sector, who struggled to develop a modern economy by advancing certain frameworks, concepts and strategies and to oppose rival concepts at the time. Over the years they created and strengthened durable systems of power within the sector which reflected their purposes, frameworks, concepts and strategies. What characterized these entrepreneurial collectives and their concepts for economic development and industrial structuring? Who were the major rivals? Were there important international links and developments associated with them? What was the role of economic theory in these developments? What legal arrangements, organizations, technologies, trading systems, etc. did they create which forced events into specific trajectories which had to be handled by later reformers? These are essential questions which I hope to be able to answer from the historical investigation.

After having identified and characterized major historical entrepreneurial collectives and events, I will follow these network systems through some of their major developments and through their rivalries in order to give an answer to the question: Which historical elements provided the opportunity to radically transform a system presumably characterized by powerful lock-ins? On answering this, another important questions would be: Did the major entrepreneurial collectives resolve their conflicts or were they still involved in intense rivalry at the time of the emergence of the market reform collective? And; was there any sort of immediate severe crisis within the sector which might explain the later emergence of a radical change process?

Another effort will be to look out for any sort of unique elements or systems created to serve specific roles in some historical program which may have

served as an important point of departure for those who engaged in re-shaping the sector into a market based system?

Taking the propositions about path dependency and the significance of early events seriously, demands us to use some space on the historical discussion – without going too much into detail. The presentation is separated into five periods:

Chapter 5:

1877 - 1905: The early electricity industry; in between small scale and large scale visions, strong local cooperative systems and a weak nation state.

1906 - 1922: Growing national resource control and early rivalry between a local cooperative collective and a national hierarchical collective.

1923 - 1945: Stabilization of the small scale program, transformation of state-municipality relations, and the roots of direct state engagements in the large scale program.

Chapter 6:

1946 - 1968: The social democratic social engineering collective; mobilizing state powers for industrial and economic growth and for economic redistribution.

1969 - 1980: Destabilizing the post-war regime. Multiple frontlines, increased governance complexity and renewed hierarchical initiatives

The separation is of course somewhat arbitrary, as the origins of collectives and controversies in one period are usually found in the previous. However, I find the separation useful as a crude overview, as the shifts represent breaking points and turns towards the stabilization of specific historical programs or towards important processes of destabilization.

5 Shaping the Norwegian electricity sector. Cooperatives or hierarchy?

The roots of the new electricity industry in Norway are found partly in the organization of the Norwegian society in the 19th century and partly abroad in the establishing of the new electricity industry as a separated global industry dominated by central station technology. The story presented by McGuire, Granovetter and Schwartz about the early construction of the American electricity industry, represents an important starting point also in the Norwegian case, by outlining its framing, its concepts and its technologies. From a Norwegian point of view, these became given points of departure by the late 1890s. The larger scale central station technology that spread through Europe, gradually came to dominate the isolated plant alternative – known as “blocks” - also in Norway, as the model for electrification of the country.

The central station technology suited quite well to the Norwegian resource situation, with its great number of waterfalls often located far away from population centers. But it did not in particular suit its demography and topography, as investment costs in electric distribution networks were extremely high in a country with a small and scattered population and difficult topographical conditions such as numerous populated islands, large mountain chains, deep and long fjords and difficult weather conditions. From the outset, it can probably be convincingly argued that a more balanced development of small scale and large scale technologies would have been more economic in the Norwegian case, if the small scale technology had been developed with greater force. But this, of course is merely hypothetical speculation.

5.1 The early electricity industry; in between small scale and large scale visions, strong local cooperative systems and a weak nation state (1877-1905)

By the end of the last century, Norway was a rather poor country by European comparison without national independence, with a small sized but relatively modern political regime in control of internal matters, dedicated towards using its judicial powers and knowledge to push for economic growth and modernization. The absence of a strong nation state, of substantial land-owning aristocracy and the semi-autonomous political status in the political union with Sweden, provided a situation in which modern political and economic ideas were easily adopted to and implemented through legislation. The first period, I have framed in between the first

introduction of electric lights in 1877 and the national independence from Sweden in 1905, when the young nation obtained control with its foreign relations. This event introduced the first substantial reshaping of the sector from 1906.

Since 1814, the country had its own constitution, a parliament providing laws about internal matters and a government responsible for internal affairs. Until 1884, when parliamentary control with the government was forced through by parliament as a core constitutional principle, the government had been appointed by the Swedish king. The national political issue had then expressed itself in numerous and continuous attempts by the parliament to withdraw powers from the government and thereby to constrain the powers and the tasks of the state administration, for instance by obstructing the ability of the state to collect taxes. The result was a rather tiny state administration with a weak financial basis largely dependent on export/import tariffs and direct state economic activities. In 1837 the parliament passed a law which constituted the municipalities as highly useful institutions for local political and administrative organization and economic collective action, with an at the time modern democratic representative system and with substantial regulative and economic autonomy and responsibility. This permitted citizens to organize a number of economic activities cooperatively within the frameworks of or associated with municipal institutional powers. This was quite unique at the time and differed substantially from neighboring countries like Sweden and Denmark which typically had similar activities organized as private cooperatives or businesses or by the state administration.

A second institutional heritage stems from the historical legal system related to the waterways. Contrary to other European countries, the state did not hold any property rights in the waterway system. In Norway, property rights to the waterways were private and belonged to those who owned the shorelands. However, the state had regulated the various interests related to the waterways, like fishing, transport, timber-rafting and industry. In 1887, a new «waterway-law» at several points adjusted to the needs of the growing industrial interests in exploiting mechanical power from waterfalls, and this had important early implications for the establishing of electric hydro-power plants. Among other things, it became possible to obtain a license from the state to construct dams across the entire river and to expropriate necessary land for the purpose of industrial use of the waterways. This provided a legal institutional framework with much better opportunities for industry to take advantage of hydro-power than for instance in Sweden and Finland, where the state owned the middle one-third of the waterways, which had to be kept open to collective use (Thue, 1994:24) This system also provided unique

opportunities for foreign industrialists to purchase waterfalls and to construct power plants to supply energy intensive industries.

A third heritage of importance was the system of state public service organization. In the 1840's the government settled on the Swedish lean public service model rather than the Danish integrated public service model. Pressures from civil society for state competencies and administrative capacities in various sectors of society, led to the organization of directorates which were separated from and subordinated the ministries. This allowed for a "lean" central administration dominated by generalists (primarily judicial experts), and for directorates dominated by sector professionals. According to this principle, the early internal ministerial office «Canal-Directionen» in 1847 became organized as a separate directorate: «Kanalvesenet», primarily as a result of pressures from the forest industry (Benum, 1979:60). This organization later became «Norges vassdrags- og elektrisitetsvesen» responsible for the electricity sector.

The early electricity technology also had important consequences. The "block" technology initially established, could be introduced as a market commodity in line with Morgan's vision in the lighting market, and gradually also in competition with steam engines and mechanical hydropower in the market for industrial machinery power. The customer base was typically the well-off urban population, public street lighting in the cities and private businesses who invested in the technology for industrial production purposes and also supplied nearby communities. Contrary to for instance the railroad-, channel- and telegraph systems into which the state rapidly became involved, only a very few saw a potential role for the state as a direct participant in the new electricity industry.

In the broader perspective, the emerging Norwegian electricity industry can be seen as a local and rather peripheral part of the international electricity industry, basically shaped by the technological and institutional systems which came to dominate in the US, in Continental Europe and to some extent in Great Britain, but translated, interpreted and adjusted in a specifically Norwegian institutional and political context with a weak state and strong municipalities.

5.1.1 The weak progressive state, the large scale industry and the local cooperative system

In Norway, the new electricity industry met a small but modern industry-oriented liberal state and a civil service system oriented towards creating regulatory support for modernization organized by local interests. The new «waterway law» in 1887 and new laws which regulated safety in electrical

systems (1891) and expropriations for wiring (1894), completed a regulatory system well ahead of neighboring countries (Thue, 1996:35-39). Despite rather poor financial resources and initial industrial capacity, electricity based industries and distribution systems were established at a high speed by any international standard.

Large scale industrial projects were based on large waterfall projects mostly financed and owned from abroad. These industries were all located close to the waterfalls, with the effect of creating an industrial structure with multiple new small cities spotted along the southern and western regions as well as a system of large scale isolated power plant systems. Also more traditional industries started out with their own isolated steam- or hydropower generators, and so did private consumers. With the emerging Edison central station technology, municipal organization gradually took over³⁷. By 1901, 24 cities had established electricity companies out of which 11 were privately organized. Of the 600 electrical power stations installed in 1900 about half were driven by steam engines. The larger ones however, were hydro-power generators (Thue, 1994:37).

Initiatives for electrification of communities were primarily dependent on small local groups of entrepreneurs or individuals with some technical education or business experience. These networks of engineers and businessmen were the leading men of their local communities, and as such saw themselves as both private businessmen and representatives of the political efforts of their communities to improve and modernize living conditions. The difference in organizational form at this early stage can usually not be traced back to very deep ideological controversy, but rather to local experiences with various institutional forms within a broad range of economic activities. If the electricity company was privately organized, it usually had some cooperative community character established through political negotiations. On the other hand did business practices from private companies influence public companies to a larger extent than what became usual later. This had to do with the strong economic autonomy of the municipalities; in particular their responsibility for tax collection and their own borrowing. The affiliated hard budgetary constraints induced a business-like practice also within the public administration with substantial focus on cost control.

³⁷ The first municipal electricity company was established in the northern city Hammerfest in 1891. The company constructed the longest transmission wire in the country (1,8 km, 1 kV) based on alternating current technology. In 1892, the capitol got its municipal electricity company as well, and soon several other cities followed.

The financing of the huge electricity investments differed between the large scale industry projects typically financed by foreign industries, financial institutions and Norwegian commercial banks, and the community based projects, which were typically financed through local savings- and loan institutions, by loans from private investors and by contributions from consumers or tax payers. Other important local institutions were the cooperative organizations of the owners of each waterway system³⁸ - especially in the eastern and southern part of the country. These organized regulations and constructed dams, coordinated the various interests related to the waterways and often became the most important local counterparts to and cooperators with the state directorate “Kanalvesenet”. These local political, financial and property rights based organizations jointly developed and reinforced an institutional system of local cooperative control.

5.1.2 The small scale and the large scale visions of modernization – and the entrepreneurial role of Gunnar Knudsen

The early electricity system developed in between two different visions for national economic development and modernization. These represented different ideas about what was seen as a good society and a good life as well as about efficient routes to modernization, and were tied on to the emerging two different parts of the electricity system; the large scale energy intensive industry and the general supply to communities and small scale industries. Advocates for “the small scale program” argued in favor of a stable, decentralized industrial development based on relatively small business units and expansion from traditional industries. Economies of scale and more challenging technologies could be managed by networks of businesses and cross-industrial organizations. The role of the state was seen as supportive and supplementary to local activities. Politically, the model was primarily represented by the social-liberal and agrarian party “Venstre”, but also the agrarian and communalist parts of the labor party “Arbeiderpartiet” favored the small scale perspective as well as district representatives within the conservative party “Høire”. In government, the leading party at the time, Venstre, actively structured state policies in line with this vision of the future.

The large scale model was based on a more growth oriented industrial program, open to foreign investments and oriented towards a centralized and plan-oriented coordination of the economy through larger private businesses

³⁸ Brukseierforeningene

and a stronger role for state bureaucracies. Advocates for this model were primarily to be found among representatives of the urban conservatives in Høire, representatives of the large scale industries themselves and among engineers and technocrats in all parties. The substantial influences of the internationally oriented and at the time highly prestigious engineer profession, tended to favor the large scale model, taken from dominant industrial countries like Germany, Switzerland and the US (Thue, 1994:13-14).

Even though the two models contained the essential alternatives in electricity sector politics, several in-between and dual positions existed, and the actually implemented policy had substantial elements of pragmatism. The high degree of pragmatism had to do with the nature of the hydro-power resources. Large waterfalls were located far away from population centers and could hardly be exploited and financed without participation from highly concentrated consumption units, whereas many of the smaller waterfalls located closer to population centers were ideal for a more gradual development of general supply. This situation provided space for both alternatives to develop along side each other.

The early visions of a more active role for the state was first and foremost represented by shipowner and industrialist Gunnar Knudsen, who later became prime-minister for Venstre (1908-1910 and 1913-1920). He was probably the most important entrepreneur behind the active state engagement in the electricity sector at the time, with substantial influences on the shaping of state electricity policies, regulatory systems and the choice of state projects. He was a true “developer” and “network constructor” across politics as well as industry, had participated in the first electricity distribution project in Norway already in 1885 and also initiated the first inter-municipal electricity organization in his home region in Telemark with the establishing of Skiensfjordens Kommunale Kraftselskap. As such, he was pragmatically oriented – more interested in economic and industrial development than in ideologies of cooperatives or state hierarchies. To him, a strong role for the state followed as there were no convincing alternative with the necessary powers and resources to do the necessary job.

Through out his political career he played an important role in shaping the electricity policy of the state. One of his basic views was that small and internationally weak national industries as well as ordinary consumers had to be protected against the financially stronger foreign industrialists. He also held that the state had to play a direct role in hydro-power generation and distribution – also in large scale industries. Already in 1892, he suggested in a letter to parliament, that the state in order to secure major energy resources for national industrial and civil society interests, should buy important

waterfalls as soon as possible (Thue, 1994:22). This role of the state however, turned out to be too far from the ideas represented by the dominant small scale local cooperative program of the time. The only viable argument for those who favored a more active state role turned out to be the “electrification of the railways” argument. From 1894 until 1902, the parliament every year allocated relatively small amounts of money to this particular purpose.

Gunnar Knudsen’s view on the role of the state, pointed at an emerging frontline of rivalry between a state dominated hierarchical entrepreneurial collective and the established small scale cooperative program. It also pointed at yet another issue, which focused on the role of the state in large scale industry projects. Should the state engage directly in large scale industry projects for the purpose of increasing state revenues and developing national resources, or should this be left to foreign capital owners?

5.2 Growing national resource control and early rivalry between a local cooperative collective and a national hierarchical collective (1906-1922)

The years 1906-1922 covers a period of general economic growth and prosperity, of rapid growth in state administrative capacity and ambitions in the wake of national independence. During these years, the state and the municipalities gradually increased their domination of the general supply sector through public property rights and a tighter regulatory regime towards private interests in general and large scale industries in particular. The stronger national program at the time managed to create an initial breakthrough which led to the first major remaking of the sector with the so called «panic law» in 1906. Through a continuous process of debate and legislation under shifting governments until 1917, a fairly comprehensive concession law system was created in order to secure national and community control with the hydropower and other national resources.

By the early 1920s, the electricity system had developed into a distinctly dual system. In 1924, 90-95% of investments in large scale industrial electricity generation were private, where as 83% of investments in general supply were municipal, 7% were state investments and 10% were private (Thue, 1994: 58). This reflected the expansion of both the small scale and the large scale programs. On the one hand, the state had adopted a policy of protecting civil society interests and needs against private industrial interests, primarily through laws which discriminated in favor of public ownership. On the other hand shows a rapid growth in large scale industrial hydro-power investments a continuous pragmatic state concession practice. The policy which emerged was to regulate in order to improve the

negotiating position of national and community interests and to direct large industrial investments to hydropower sites which were either too large or too distant from population centers to be relevant to general supply interests.

5.2.1 The significance of the concession laws

The breakthrough for the concession law process was forced by press initiatives, in particular the newspaper “Verdens Gang”, which in 1906 published a number of critical articles. This occurred in an atmosphere of recently achieved national independence and national symbolic unity. Several of the articles attacked the role of director Gunnar Sætren of the directorate Kanalvesenet and one of his employees, who had been involved in hydropower projects with industrial clients like the Swedish financier Marcus Wallenberg, who was accused of systematic speculative purchasing of Norwegian waterfalls. A «panic-law» was approved by parliament on April 7. 1906, which stated that property rights and rights to exploit waterfalls could not be purchased by limited companies or foreign citizens without permission from the King. On June 12, the law was replaced by a more general law which expanded the principle to include forests and mineral resources in addition to waterfalls (Vogt, 1971:78-82).

The main strategist directing the legislative process was Gunnar Knudsen, and gradually many of his early visions became established as the policy of the state. Parallel to the legislation process, the parliament increased its budgets for acquisition of waterfalls, and in 1907 the large Nore waterfall in Buskerud County in the central part of south-eastern Norway was bought, a decision with important implications for the future structuring of the industry. A new director of Kanalvesenet; Ingvar Kristensen, was employed in May 1907, and the name of the directorate shifted to «Vassdragsvesenet».

The increased interventionist practice and the concession legislative form was not entirely new. Both the railway system and the telephone and telegraph systems had important concession systems. More importantly perhaps, was the influences from abroad where private monopolies in for instance the railway- and coal industries had shown themselves to be costly experiences to consumers. Also foreign examples - like Switzerland - of attempts at increasing the role of the state in the hydropower industry, influenced substantially the Norwegian debate. Countries like Switzerland, Austria, Germany, France and Italy all had established various kinds of state dominated regulatory systems in their hydro-power systems (Thue, 1994:67). The increased state efforts to regulate and discriminate in favor of national and public interests should accordingly be seen on the background of the efforts of transnational capital interests to cartelize or monopolize

markets at the time and to gain world wide control over resources such as forests, minerals and energy.

The panic law was gradually extended into an integrated system of laws which covered a multiplicity of industries, purchasing and renting of properties and user rights, waterway regulations, expropriations, operational licenses, state and municipal fees and compensations, the use of Norwegian equipment and workers, etc. In the final 1917 version, also Norwegian individuals and companies with unlimited responsibilities had to apply for purchasing concessions, which usually could be obtained for a period of 40 - 50 years, where after investments returned at price zero to the state. Municipalities and counties did not have to acquire concession to buy waterfalls, unless the intent was to supply power to large scale energy intensive industries. Other concessions, such as for waterway regulations, were compulsory also for municipalities and counties. By the end of the process, the state under the Knudsen leadership had established a substantial national defense as well as a resource control system with radically extended powers and government capabilities. It came to represent a permanent, institutionally locked-in system which constitutes the basic regulatory system also after the market reform of the 1990's.

Despite the legal restrictions gradually imposed on private and in particular foreign industrial investments, large scale power intensive industries expanded rather rapidly during the entire period. The concession system developed only gradually into more restrictive and complete law systems, and hydropower resources were plentiful and by international comparisons cheap to exploit - also when the costs of government fees, local compensations and obligatory electricity supply to local districts were included. From 1917, after a few years of particularly rapid war-related industrial expansion, the state tightened its pragmatic policy (Thue, 1994:67-69).

5.2.2 The general supply sector: growth and conflicts

During the growth period from 1906 to 1921, there were two major frontlines of controversy. One was between the publicly organized cooperative electricity companies and the private electricity companies. The second frontline gradually arose between the established cooperative system and a rapidly emerging national hierarchical program affiliated with the increased ambitions and capabilities of the state administration and with international developments towards large integrated electric utility companies.

A third controversy at the time, which had more to do with regional control with resources and markets, emerged between the cities and their surrounding rural areas, where the cities controlled the more lucrative markets and the rural municipalities controlled un-exploited hydropower resources. Rural municipalities from around 1913 organized inter-municipal or county based electricity companies to organize their electrification projects, to challenge the nearby cities and to overturn local small scale plant alternatives.

Before 1920, private electricity supply companies still played important roles in some regions. The largest of these companies were Hafslund AS in Østfold and Treschow-Fritsøe AS and Skollenborg AS in Vestfold. Also Norsk Hydro AS hold contracts to supply areas in Buskerud and Oslo. In Vestfold however, private supply was forced into a public takeover by the county in 1920³⁹. The contract hold by Norsk Hydro turned out to be only temporal. Only Hafslund has managed to maintain an important regional position until today in the general supply system.

The direct state engagement in the electricity sector rose from Knudsen's early vision, and was gradually strengthened by a variety of similar ideas entering from abroad. It became linked with demands from weaker regions which were unable to finance their own power production and electric network systems and accordingly lagged behind in the modernization process. Some of these continued to establish small scale isolated plant systems until the mid-1930's (see for instance Rinde, 1995).

From 1906 to 1920, the state established the foundation for its emerging direct engagement through extensive purchasing of waterfalls. By 1920, the state owned about 20% of the estimated hydro-power potential in the country. Until 1916, these investments were still explicitly related to the railway issue. The many years of arguments from prime minister Knudsen and his associates for a more direct role for the state, finally produced a breakthrough during World War I, when the role of the state increased in many respects as the young and inexperienced nation state had to respond to the various pressures from the European warfare.

The actual political breakthrough for the more active direct state engagement occurred in the economic boom period between 1916 and 1920 when the parliament allocated much larger resources to regulate waterways and construct hydropower plants. Three different arguments combined in

³⁹ Only rural municipalities were included in counties at the time.

framing the new role of the state. The first argument was the traditional electrification of the railways argument. The second related to the fact that a further expansion of electrification in the south-eastern region depended on the exploitation of larger waterfall systems and thereby also on cross-regional coordination. Many now saw the state as the “natural” organization to carry out this cross-regional operation. The third argument related to the interests of the less populated rural areas who argued for a greater state responsibility for the electrification of their regions. Apart from the purchase of the Glomfjord waterfall in Nordland in 1918, all state investments related explicitly to either of these three arguments. All together, the state by 1920 only represented 7 % of the supply to general consumption and none to large scale industries. By 1940, the share had increased to 10% of total production.

5.2.3 The emerging national hierarchical collective

Both the ministry “Arbeidsdepartementet” and the directorate “Vassdragsvesenet” experienced a rapid growth in staff related to hydropower issues. From having only 7 employees in 1907, the state directorate expanded to 110 at the time of its reorganization into “Norges vassdrags- og energivesen” in 1921, excluding those directly engaged in state hydropower constructions. Additionally, the state established two separate permanent commissions directly subordinated the ministry; the “Electricity Commission” and the “Waterway Commission”, to administrate the various concession- and control systems. Other non-permanent commissions also played important roles in the increasingly complex administration of the sector. In 1921, all of these institutions were re-organized into the NVE, which became a joint state organization for regulatory- as well as state production activities, organized outside and subordinated the ministry.

Ingvar Kristiansen, director of “Vassdragsvesenet” from 1907 to 1921, strongly represented the idea that the state should hold the dominant role in the future electricity generating and supply system. His vision was that of an integrated national organization of the entire general supply system within the framework of a state monopoly. This vision gradually came to constitute an influential state-hierarchical collective with strongholds among leading engineers which hold national positions and perspectives rather regional, and which closely associated with similar continental entrepreneurial collectives at the time.

As the state substantially increased its waterfall possessions from 1907, it gradually became clear that it had no convincing and coherent policy for the use of these large resources. The government was accused of putting a dead

hand on the resources. The government in 1911 appointed a commission with the primary purpose to come up with a state policy. In 1919, at last, the government presented its proposition to the parliament which however contained no clear policy. But, it suggested to establish yet another organization to produce such a policy and to carry it out; the NVE.

Several issues, debates and events influenced the formation of the new organization. Firstly, there was a debate over the organization of the commercial interests of the state. Representatives of the local cooperatives as well as the large scale industries argued that state commercial activities should be organized separately and at a distance from the regulatory responsibility of the state. A joint state organization would increase the possibility - or at least the impression of such a possibility - that the state would favor its own competitive activities over county, municipal and private interests. Gunnar Knudsen and his government however, wanted to create a joint advisory board for its future electricity policy. This suggested a joint organization of all state electricity sector activities in order to secure coordination, control and breakthrough capability.

Secondly, there was the question about the autonomy of the directorate. At least rhetorically, there was a broad support for a business-like organization of the directorate with substantial autonomy and independent responsibilities. The debate however occurred in connection to an earlier and similar debate over the role of the board of the state railway company NSB, where the business oriented board had been arguing strongly for a much more independent role vis á vis government and parliament. The discussion in that case ended when the board left in protest and the government passed a new law which only moderately provided a more independent position for the new board. This process substantially influenced the debate on the organization of NVE. In particular, it became clear that the direct engagement of the state in hydropower generation and distribution was to be rather tightly controlled by the government.

By 1921, a new and more ambitious state directorate prepared for increased state leadership. The parliament however, represented an important counterpart to these ambitions, dominated as it was by the small scale cooperative program and local/regional interests. On several occasions it turned down the government and the directorate, for instance by forcing the government to sell state owned waterways to municipalities and counties.

5.2.4 The unsuccessful hierarchical reform; the first national plan

Parallel to the work with the reorganization of the state directorate, the government in 1918 established a new “Electricity Supply Commission” to work out a national plan for the entire electricity sector. Such a plan had been advocated by leading engineers for quite some time, and received increasing support as the impressions of the escalating economic boom and lack of overall state governance and control became apparent. The Commission was established in January 1919 with the mandate to provide an in principle framework for the future electricity system, a general plan for the developments in each region, and a financial plan. Its dominant actors became Professor Olav Heggstad from the Norwegian Technical University in Trondheim (NTH), and the new director general of NVE; Birger Stuevold Hansen, who from 1921 served as the chairman of the commission. The commission had a representative character, aimed at collecting different professional, regional, business and consumer interests – a purpose which turned out to be in conflict with the radical restructuring approach represented by Heggstad. The large scale industries were poorly represented from the beginning, and later became without representation.

The project was estimated to be finished within one year. It took however four years and much more money for the commission to finish its ambitious work. The approach of the commission was that of the complete, scientifically planned change; a rationalistic developmental approach in the sense that all the different aspects and details of a centralized, planned and coordinated development of the electricity system were presented and pushed jointly, based on the belief that scientific and technological rationality would be overwhelmingly convincing. The commission suggested five new laws or major changes in the existing legislation. Additionally, it presented a national plan which contained a general overview as well as outlined a comprehensive and detailed plan for all the 117 electricity regions identified by the plan.

The economic slowdown from 1920/21 however, tended to reduced the political ambitions of state politicians. Demand for electricity staggered and declined as well as the financial capability of the state. The detailed planning had also revealed a more realistic understanding of the enormous technical and financial problems involved in the construction of an integrated national transmission system, which had been advocated by the most visionary engineers.

The commission presented a radical hierarchical model. It suggested increased state powers to force local entities into larger units as well as

superiority for counties over municipalities in expropriations and in rights to supply consumers within their own territories. The plan in reality suggested something close to county based monopolies in supply as well as time constrained regional state monopolies related to state investments in large hydro-power plants in order to secure sufficient cost recovery to these investments. The commission also suggested to exclude private companies all together from participation in general supply.

The national plan became forcefully attacked by local interests. The vision of a complete takeover of the electricity system by the state through gradual undermining of local autonomy, fuelled a heated debate and led to a completely negative reception of the suggestions presented by the commission. In its summary conclusion, the board of the NVE stated that time had not yet come for county- or state monopolies in the electricity system. None of the legal suggestions were eventually presented to parliament. As a result of the strong opposition to and limited results of the ambitious planning and legislative suggestions, the director general of NVE; Birger Stuevold Hansen, chose to withdraw from his position in 1925. Perhaps the most important influence of the enormous work of the commission in the relative shorter run, was its idea about a new state electricity bank. In 1927, the state established “The Municipal Bank⁴⁰” with Stuevold Hansen as the chairman of the board.

The large scale private industries also reacted negatively to the suggestions put forward by the commission, but their arguments were completely different. The industry organized their own committee on the subject which presented its own plan which argued for an integration of the public and private electricity systems into large electricity companies, organized as joint stock companies with participation by municipalities, counties, state and private interests. These ideas were typically influenced by organizational structures in the German electricity system. The industry argued that participation by private interests would direct the attention of local electricity companies out of their municipal constraints and improve the capability of local and regional electricity systems to form rational regional entities and cross-regional cooperation, that such a system would reduce some of the political problems involved in public sector organizations and secure a more modern and flexible business oriented organization. They also argued that the now separated large hydropower system from the general supply system represented an irrational structure. These arguments however, did not receive support from the publicly organized local cooperatives, and

⁴⁰ Kommunalbanken

left hardly any visible tracks in future developments - until the market reform process in the late 1980s.

The conflicts and debates over the national plan ended with something close to a complete breakdown for the state-hierarchical collective, which led to a set back for these ideas in Norway for many years to come. The industry's joint private-public program also failed to produce a political breakthrough, and its entrepreneurial collective found itself outside influential positions. Established small scale local cooperative collectives had won a complete victory. "Supported" by the economic decline, it destabilized the hierarchical ambitions within NVE and stabilized its own program through out the 1920's and early 1930's – including the supportive and supplementary role of the state (Thue, 1994:187-211).

The approach of the national plan strategy was strikingly different from the concession law process. It represented a complete and simultaneous approach aimed at a planned change of all relevant aspects of the system. Apart from directly provoking power struggles with those holding existing property and governance rights, the detailed and complete approach provided multiple opportunities for various counter-attacks from all kinds of positions and undermined the ability of the reformers to build alliances. This made even minor changes impossible to achieve. The process dropped dead, and the forces behind it were set back for an entire generation. The case nicely illustrates the breakdown of an ambitious entrepreneurial collective – with initial state institutional powers and academic as well as political support. During the 70 years to follow in the history of Norwegian electricity sector restructuring, the defeat in 1922 set the stage for a remarkably slow industrial restructuring process as compared to other European countries.

5.3 Stabilization of the small scale program, transformation of state-municipality relations and the roots of direct state engagements in the large scale program (1923 – 1945)

The third period 1923 - 1945, covers a period of stabilization for the cooperative small scale program during the more or less strong economic recession between 1920 and 1935, the years of economic recovery until 1940 and the war period 1940-45. In Norway, the 1920's were mostly difficult years, in part because of the efforts of the various governments to comply with the international "back to the gold-standard" monetary policy, after the inflationary post-war boom period. The policy resulted in a relatively strong deflationary economy which increased debt-values and unemployment rates and decreased wages and public sector budgets. On top of this, the strong

international recession from 1929 radically reduced export markets on which the large scale industry was completely dependent. From the mid-1930's, the international as well as the Norwegian economy gradually recovered.

One important development from the mid-1930's, was the industrial reorientation of state and county electricity policies. This resulted from a stronger production and employment orientation caused by the high unemployment rates, from the increase in international demand for energy intensive products and from the financial problems involved in the construction of remaining large waterfalls. For pragmatic reasons, large industrial customers were needed to absorb a sufficient share of new generating capacity from these larger projects from day one. Long term electricity supply contracts between public electricity generators and energy intensive industries gradually became a common practice. In this way, the small scale program and the large scale program came to interact directly with one another.

Finally, the German occupation from 1940 to 1945 also left important durable patterns in the electricity sector. Firstly, when faced with a loss of control over the state administration, the concession laws and the local cooperative collectives became important national defense lines as Norwegian interests wanted to reduce the powers the German controlled state institutions. Secondly, the radical growth in large scale hydro-power and industrial investments initiated by the Germans, provided a new basis for a direct role of the state in the large scale industry program after the war.

5.3.1 The economic recession and the destabilization of municipal autonomy

The combination of the 1922-failure of the hierarchical program and the economic recession, provided for a long period of time when the cooperative small scale program was practically without serious rivals. However, the economic crisis gradually undermined also the strong autonomous status of the municipalities.

Electricity consumption decreased and prices had to be reduced in order for the consumers to maintain their attachment to the electric system. To both public and private institutions who had invested heavily into the electricity system during the inflationary period, the consequences were dramatic. The state investments resulted in huge financial losses, which undermined further attempts at increasing the direct role of the state in the sector. To many of the municipalities, the economic recession had severe economic consequences. Already in 1920, the parliament decided to lend 50 million NOK to various municipalities in order to complete hydropower investments

under construction. By 1925, 49% of total municipal debt was directly related to electricity investments (Thue, 1994:215). As the deflationary policy undermined their ability to repay the loans, the state had to engage as an inter-mediator in between the municipalities and their creditors by refinancing municipal debts.

To some of the municipalities and counties, the economic recession ended in severe crisis and in a few cases in outright bankruptcies. In particular some of the counties, who had taken on substantial investments, experienced substantial losses and lost much of their political legitimacy. In the wake of these events, the parliament passed a number of new laws which introduced state control with municipal taxation, debts and administration, after which municipal autonomy never really recaptured its previous position. The new state funded “Municipal Bank” became an important instrument for the state to direct and support local developments.

By 1937, the board of NVE calculated the value of state support to local electricity companies to NOK 68 million, of which about 40 million directly covered losses. Comparably, the total state direct investments in electricity generation and distribution up to this point amounted to 88 million, of which an estimate of 35 million had been lost during the recession (Thue, 1994:215-216). From 1938, the state established a permanent economic support fund to subsidize rural electrification, which also became a useful system of power for state regulators (Hindrum, 1991:9).

However, many of the stronger local cooperative systems – in particular in the south-eastern part of the country - maintained a relatively sound economy during the period. Many of them had invested relatively little during the inflationary period, and were able to both buy electricity at low prices during the recession and to invest at low cost. It is illustrative to note that both liberal, conservative and labor governments at various points between 1923 and 1936 maintained an open attitude towards selling the large Nore waterfall to regional interests (Thue, 1994:216-221). The openness to such sales however, ended when the economy recovered in the second half of the 1930's.

5.3.2 The cooperative system; from local networks to regional cooperatives

The Electricity supply commission had argued for a hierarchical state-county-municipal system to cope with the increased demands for cross-regional coordination of investments, system operations and supply. With the rejection of the hierarchical model, the cooperative system was faced with the need to develop larger regional cooperative institutions and

organizations. In the districts, municipalities typically cooperated within the counties or within “natural” geographical regions. A larger system of coordination however, gradually became established in the south-east. Here, integrated regional cooperative systems had first been initiated from the private Hafslund system in Østfold, then from the interaction of Norsk Hydro in Rjukan (Telemark) with Drammen, Oslo and other population centers in Buskerud and Akershus, and from the interaction between the private Treschow-Fritzøe company in Vestfold and «Skiensfjorden Kommunale Kraftselskap» in Telemark during the post-war period.

In the beginning, Norsk Hydro AS played an important role. Through its 1920-contracts to sell electricity to several public electricity distributors, it served as the contractual counterpart to the first formalized cross-regional organization; “Fælleskontoret for Kristianiafjordens Elektrisitetsverker” in 1922. From 1925 this organization coordinated local and regional interests towards the large state owned Nore hydropower station as well. From October 1928, all power stations within this south-eastern part of the country were technically integrated and coordinated by the organization which in 1932 was re-named “Samkjøringen for kraftverkene på Østlandet”. Even though the state was not a member of the organization, the Nore power plant played a dominant role in the technical coordination of the integrated system. The command position of Samkjøringen provided its members with a strategic opportunity to take economic advantage of the direct state engagement in peak load management.

NVE from the beginning, hold the position that technical coordination should be directed by NVE, based on the argument that anything which needed to be coordinated across county borders was a state responsibility. Accordingly, the directorate opposed to the superiority of Samkjøringen. NVE argued that Nore at least should be seen as an autonomous state responsibility which could be technically governed independently from the rest of the system. By 1929, the directorate had to give in to the argument that this was technically irrational, and accepted being instructed by the director of “Samkjøringen”. The organization thereby established a durable superiority over the NVE on the issue of technical coordination.

Both the negotiations with the state over purchasing of power from Nore, the bargaining over a complete regional cooperative takeover of the state owned plant, and the rivalry over technical governance control, contributed to the formation of a strong and hierarchically organized cooperative organization. From 1935 the conflict between the state and the electricity companies in south-eastern Norway demented. In 1937, Samkjøringen prepared for taking up the NVE as a member of the organization, and the government decided to let NVE join the organization from July 1938. The electricity sector in the

south-east was thereby constituted as an integrated state-cooperative governance system.

By the mid-1930's, the ambitious state electricity policy was found in ruin. Most of the state generated power was supplied in the relatively rich and densely populated areas in the south-east, at prices below investment cost - rather than in the weaker regions which had actually been the political target. About one third of the invested state capital in hydropower generation was lost, and the expected profits which had been intended to support electrification in rural areas, had not materialized. Total national production by 1939 amounted to only 12 TWh – one tenth of the 1990 level. The state share was 1.2 TWh (10%).

Gradually, new ideas about a more active role of the state in the economy spread from abroad. This occurred under the impressions of a rapid industrial growth with full employment in the Soviet Union in a situation with a severe economic set back in the capitalist economy. On the other side of the political specter however, opposition against the concession system grew with the recovery of the economy, as economic opportunities for new industrial projects became apparent towards 1940. Uncertainty over where to go was considerable. Then, the war came to shape things in very different ways.

5.3.3 The war: Large scale German industry and small scale Norwegian defense

During the war, the electricity sector expanded more rapidly than in the 1930's, and the economy within the sector radically improved. The German electricity policy in practice represented a continuation of the dual system, even though the German administration argued for tighter organizational integration and large scale war related investments - ideally organized in line with German electricity systems with a few large national joint stock companies with both private and public interests represented – or if possible, as only one national electricity company.

The German “Reichskommissariat” established its own electricity administration which worked in parallel to the state ministry and the NVE, usually with no clear cut separation of responsibilities between them. They also established a cooperative commission with Norwegian participation until the summer 1941. Wartime needs for more metals and hence large scale industries dominated German interests in Berlin, whereas the administration in Norway to a larger extent advocated a more long term strategy based on acceptance and cooperation with the Norwegians. Berlin however, forced its interests through, and a wartime oriented large scale industry program came

to represent the dominant part of the German electricity policy. Very ambitious plans were presented to increase the aluminum production to 7 times that of the Norwegian 1939 level, as well as large plans for other types of war related products. To own and operate these projects, a new company, «Nordische Aluminium Gesellschaft (Nordag) was established in Berlin in 1940 under control by the German Air Force (Luftwaffe). It became established in Norway with two different subsidiaries, of which one had participation from Norsk Hydro (Vogt, 1971:134).

The ideas presented by the Germans, corresponded closely with ideas which had been advocated by Norwegian industrialists for many years, ideas which were highly influenced from Germany in the first place; those which had been pushed aside by the Electricity Supply Commission in 1919-22. Representatives of these industrial interests became the main cooperative counterpart to the German electricity sector administration - at least until late in 1941. Their detailed knowledge about the Norwegian hydro-power system as well as about remaining un-exploited waterfalls, made it possible to construct a large operational plan rather quickly.

The parallel German administration, shifting political alliances in Berlin as well as in Oslo and the conflicts within the NS-party, contributed to a substantial fragmentation of the state governance system during the war, which reduced the ability of the German administration to carry out a powerful and coherent policy. State employees engaged actively against the German large scale industrial plans. In this situation the concession law system represented a national defense system. The German companies did not meet the demands of the laws, and the German administration had to force their plans through the Norwegian state administration - usually after investments had already started. These events further reduced the legitimacy of the German policy in the eyes of the Norwegians, reduced German access to Norwegian financial resources and knowledge, and ended the Norwegian participation in the cooperative commission.

The German policy succeeded to a very limited extent. None of the new large scale industries were completed by the end of the war, and the actual production of aluminum had been reduced by one third as compared to 1939. Both the lack of resources, materials and qualified employees caused by war events, sabotage and administrative obstructions contributed to this outcome. Combined with a steady growth in regional- and local generating capacity and the wartime coal shortage, general consumption increased by around 50% from 1940 to 1945. Hence, despite the German pressures to increase large scale production, the actual expansion of consumption occurred in the general supply part of the system (Thue, 1994:347-386).

5.3.4 Public or private, cooperatives or hierarchy?

The early history of the Norwegian electricity sector provided the industry with a number of specific structures which became locked in as durable patterns. One of these was the separation of the industry into a dominantly public sector cooperative system in general supply structured in accordance with federative organizational principles, and a private large scale industry sector.

Through out the period a state hierarchical alternative challenged both, without significant success. In fact, a severe breakdown for the hierarchical program in 1922 led to a radical set back for the state-hierarchical program through out the period. At least one important reason for this breakdown was the highly rationalistic and complete reform strategy which prevented the reformers from establishing links and alliances needed to carry suggested reforms through the political system. In its absence, the cooperative system gradually developed a cross-regional organization with both bottom-up federative structures and strong hierarchical capacities and competencies, which forced through the ability to also direct NVE power plants. This provided the cooperative approach with an important instrument for sector coordination and governance.

The small scale cooperative program reinforced its position in between 1922 and 1935, but also experienced a gradual undermining of one of its core institutional elements; municipal autonomy. During the German occupation, the cooperatives once again reinforced its legitimacy in the role as a national defense line. Until the end of the war, the Norwegian general supply electricity sector remained predominantly cooperative in structure, headed by a still ambitious cooperative entrepreneurial collective with Samkjøringen in command position.

The third element which became an important durable part of the system, was the Concession Law system, which represented the national resource control issue. Important to note, is that apart from providing the state with a strong regulatory capacity, it also provided municipalities and counties with substantial institutional advantages both towards private national interests and towards state domination. National resource control and local and regional electricity sector collectives were thereby tied closely together, and private interests to a major extent became locked-out from the general electricity supply industry .

6 Re-shaping the electricity sector. State dominance, emerging complexity and unresolved controversies

Both war experiences and international political and economic developments were essential to the major transformation of the Norwegian electricity sector during the post World War II period. In particular to those who had been actively involved in the international warfare activities, the war left an overwhelming impression of the resource mobilizing and logistical capacity of the warfare states, as well as of the powers of and necessity of international political and economic cooperation. But, the war had also created an atmosphere of national unity and collective political values, a willingness to overcome traditional conflicts and to create a better society. All of this transformed into a new active role of the Norwegian state in the civil society economy.

In the 1930's, impressions from the rapid industrial growth and full employment in the Soviet Union had added political legitimacy and enthusiasm for economic planning and political governance of the economy – also among scientific economists. But, the new policy had even deeper roots in developments in the US in the post World War I period, were “Fordism” and “Taylorism” came to dominate industrial organization thinking and practices. One example of a specific American project which came to represent a new model for large scale economic modernization, was the Tennessee Valley Authority (TVA) project decided by Congress in 1934. It differed from traditional large scale industry projects by allocating an active role to public institutions and governments. The TVA was a huge public corporation which constructed dams and generated electricity, established fertilizer plants, controlled floods, restored forests etc. for the purpose of regional industrialization and economic growth in economically underdeveloped Tennessee (Yergin and Stanislaw, 1998:54).

In the wake of a dramatic bankruptcy in 1934 for the huge privately owned Edison Chicago Company headed by Samuel Insull, the TVA through its largeness and its public interest orientation became immensely popular by the Roosevelt “new deal” administration as a different approach. Despite vigorous counter forces within the US electric utility sector (Hughes, 1983:221-226) – the TVA became the more influential political model through its popularity with the government and the federal administration. It also made a substantial influence on the new generation of engineers through David Lilienthal's best selling book: “TVA: Democracy on the March” (1944). Large publicly owned companies and industry projects became the

completely dominating model in Europe after the war - with substantial support also from the American government.

The entrepreneurial collective which came to take power and to remake the Norwegian society with substantial force after the war, had been educated and trained under these international impressions and had been pulled together during the war by the exile government in London. It emerged out of ideas developed within the Labor Party in the 1930's, out of war impressions, out of initiatives to take leadership after the war, out of developments within economic theorizing and out of close associations with international political allies, who directed and coordinated the new political and economic order in Western Europe. In an important sense, it also came to represent a continuation of the developmental approach of Gunnar Knudsen, which had come to a halt between 1921 and 1935.

Contrary to for instance in Great Britain and France, where the state nationalized a number of large industries including the entire electricity industry, the local cooperative collectives had strengthened their political legitimacy within the Norwegian electricity sector during the war. The exile government and state administration which arrived back in Norway in 1945, accordingly faced a strengthened small scale cooperative rival to their large scale industrial modernization program back home.

By taking control of the "commanding heights" within the state administration and by establishing tight relationships with the Oslo School of Economics and the many new groups of professionals within various sectors of society, the new Labor Party regime managed to establish a system which to a great extent balanced and integrated the large scale program with the traditional cooperative. Politically and professionally governed sector hierarchies were combined with popular and democratic participation in cooperative organizations. Rather than confronting the cooperative program, the new entrepreneurial collective sought to enroll the cooperative governance systems by giving them specific roles within its own hierarchical model. When observed from the point of view of the cooperative organizations, the roles they were given provided opportunities for influence and exploitation of the regulatory capacity of the state for their own purposes. This mutual transformation and enforcement of state hierarchy and cooperative programs is broadly seen as the trademark for the Norwegian post-war corporate governance model.

In sectors of the economy with strong cooperative traditions, national cooperative organizations had already before the war been given substantial political roles and responsibilities. In many instances they came to represent something in between a state directorate and an open membership

association – or rather a mix of both. In the electricity sector, the corporate system was primarily based on a combination of an active direct state engagement represented by the NVE and the cooperation of generators (including NVE) in various regional cooperatives similar to Samkjøringen, which gradually merged into one national organization as the regional electricity networks became linked to one national transmission network in 1970.

6.1 *Hierarchy or markets? Rival collectives in economic theorizing*

During the 1930s, a major controversy emerged within economics between a hierarchical school of thought and a liberal market school. The positions were affiliated with the controversy between socialists and economic liberals in more general political terms. On the hierarchical/socialist side economists such as Ragnar Frisch and Jan Tinbergen developed econometrics as an area of economics which integrated statistical theory, business cycle theory and -modeling with planning theory and development of operational instruments for national economic planning purposes. Both were later given the first Nobel Prize in economics in 1969. Following Frisch and Tinbergen, the Polish economist Oskar Lange became very influential – not at least at the University of Oslo, where Frisch and his students had established what was to become known as one of the international strongholds for the hierarchical school; the Oslo School of Economics. Lange's publications became highly influential during the war also in the US, where he was a professor at the University of Chicago. In 1943 he took over as the editor of the journal "Econometrica" after its founder and first editor, Frisch (Barth Jacobsen, 1998:99)⁴¹.

Lange was in part influenced by Joseph Schumpeter's ideas about technological innovations as the source of economic growth, which had roots back to Marx. To mobilize state powers and science for large scale innovative economic growth was a part of his program. He was however even more influenced by the Austrian economist Ludwig von Mises' theories about the role of price-information in the economy. Lange brought this idea into his state-economic program by giving professional economists

⁴¹ After the war, he became the Polish ambassador to the UN, and in 1949 he was called back to Poland, where he later became the provost for the school for economic planning in Warsaw, till he died in 1965. With the emerging cold war in the 1950s however, he became discredited in the West.

the task to imitate the price-formation in markets through calculus, within a hierarchically organized production system. The joining of these two elements resulted in a program for a hierarchical, scientific economic system based on state ownership, control and initiative, where the marginal cost based price theory was to be applied to ensure efficient resource allocation to the various parts of the economy. Optimal prices had to be designed by economic professionals within a central planning unit.

At the time, the planned economy represented a serious alternative to the miserable state of capitalist markets during the 1930's, and Lange and his allies argued strongly that economic theories traditionally applied to markets, could more efficiently be applied to centralized planning than to competitive markets. Markets could be imitated by planners and prices on input factors could be set so as to utilize resources efficiently for innovative growth. Positivism within the natural sciences had expanded into an economic social engineering program; the entire economy was to be turned into a laboratory where everything could be created and controlled by expert scientists. This was the economic program which came to influence international academic economics right after the war – in Norway as well as in the US, England, France and elsewhere - in addition to its dominance in the socialist countries.

The major opponents to Lange and the hierarchical approach, were the “Austrian school of economics” represented by L. von Mises and his student F. von Hayek, and those who came to establish what was to become known as the “Chicago school”; in particular A.A. Alchian and M. Friedman, after Lange left Chicago and Friedman became appointed as a Chicago professor⁴². The Austrians and the Chicago economists argued that the hierarchical “imitated market” would not work due to the absence of the individual profit motive in state owned economies, the overwhelming need for centralized information transactions and the limited room for individual choice. This would hamper innovative activities and undermine growth. Rather they argued that rational social order and economic development should be based on the activities of self-organized market actors (Vaughn,1994:1-11).

The hierarchical approach came to dominate the market liberal alternative in between 1945 and approximately 1975. With the discrediting of Oskar

⁴² Many of the leading international economists at the time worked together within the Cowles Foundation which was located at the University of Chicago at the time. It later moved to Yale University.

Lange in the early 1950's, the Keynesian approach which focussed on the role of the state in macro-governance of the economy, moved to the center in the capitalist world and to dominate the central planning approaches of the industrialized states in the 1960s and early 1970s.

The ideas of Mises, Hayek, Alchian and Friedman were pushed back into the universities, where they continued to develop their theoretical concepts and to produce arguments in order to expand their competitive market concepts. Given the strength of the hierarchical program in Continental Europe, the Austrian tradition moved to the US and England. In Norway, their ideas first and foremost came to be represented by the economist Trygve J. B. Hoff and the journal "Farmand", in which Hoff was the editor for many years between 1935 and 1966⁴³. At the time he was commonly regarded a right wing rebel – even by the conservative party.

6.2 The war experienced social engineering collective; mobilizing state powers for industrial and economic growth and for economic redistribution (1946-1968)

Many of the dominant actors of the emerging Norwegian social engineering collective had been involved with the Labor Party exile government in London, in the government administration and the institutions it created in order to follow German activities in Norway, to govern the Norwegian participation in war activities and to prepare for the takeover of political power at the end of the war. In this environment, a new export oriented large scale industry policy was developed within the government's industry committee in 1943, under the Ministry of Supply. The new policy was based on detailed studies of German large scale investments in Norway, and concluded that these primarily had to be exploited for large scale industry purposes. The committee was headed by professor Fredrik Vogt, who had been the provost of NTH until 1941. Other important members were Konrad Nordahl, who later became the leader of the social democratic association of labor unions (LO) and Nicolai Stephansen from Norsk Hydro.

The economist Erik Brofoss headed the Industry Office in the Ministry of Supply. He later became the Minister of Finance from November 1945 and the Minister of Commerce from December 1947 to 1954. From these two "commanding heights" he directed the establishing of a tight alliance between the social democratic government and the economists at the

⁴³ Hoff had also participated in the debates within the Cowles Foundation in the late 1930s.

University of Oslo who developed national economic planning-, control- and governance systems based on the ideas of Oskar Lange and the econometrics of Ragnar Frisch and Jan Tinbergen. Together they established a new organization for national statistics; the Statistical Bureau (SSB) as a “manufacturer” of the information and governance systems needed. As the minister of the new Ministry of Industry (ID) was appointed Lars Evensen, who had served in a core role for the LO in Stockholm and London during the war, and who had been involved in shaping the post-war political program of the AP (Barth Jacobsen; 1998:65). Just like the TVA project, it focused on the electricity sector, the electro-mechanical, the electro-technical and the power intensive industries as the main “engine” in large scale social-economic projects, for expansion, economic growth and social welfare.

The political heritage within the AP on the subject of state power supply to large scale industry, was ambiguous. The party had taken over government in 1935, but had mainly continued the electricity policy of the previous social liberal governments. This policy was closely in line with an important communalistic and agrarian part of the party. From 1933, a more active policy of the state emerged within the party, which stressed the need to exploit the large state owned waterfalls and to support the establishing of new large scale industries as well. In 1934, a technological association within the party became established to continue the work on these ideas. Because of the limited access to international markets at the time however, these ideas faced severe obstacles. The 1936 party plan for electrification, accordingly focused on supply for traditional industries and households and on rural electrification (Thue, 1994:388-390).

The state electricity policy was the theme of a broad, representative electricity committee established in 1945, headed by NVE. The committee presented its report in 1947, but the government never presented it to parliament. The report argued for a continuation of state priorities for general supply rather than large scale industries, and for using the large German investments to general supply purposes. The committee obviously represented attitudes which dominated the sector rather broadly. On this background, it became clear that an explicit state political shift towards the large scale model would have met substantial opposition in parliament. Accordingly, the strategy became one of capturing the operational “commanding heights” through state administrative changes and a pragmatic step by step approach directly related to specific waterfall projects. It became based on a network of representatives distributed within the state administration, the universities and research institutions.

One important aspect which made it possible to expand the role of the state in industrial production after the war, was the ability of the state to obtain

foreign aid and loans. First through the Marshall-plan, and later through the financial credibility of a state with a radically improved tax-base. State loans could be invested directly by the state or reallocated to counties and municipalities through the Municipal Bank. The state's financial opportunities also suggested a state electricity supply to new power intensive industries rather than traditional industrial self-supply. To local and regional electricity companies, both the tight state control on foreign borrowing, and the lower cost of state loans, turned state loans into a major financial option. The radically increased demand through out the period, however, made it possible for non-state electricity companies to a great extent to finance new investments directly from internal funds. This financial strength of the local electricity companies, provided for an important defense against an even stronger state dominance between 1947 and 1960.

Gradually, these developments stabilized a network of interdependencies between the state and the entire electricity based large scale industry. Many different networks became affiliated with the maintenance of this alliance; international political and financial institutions, large multinational companies, local districts, electricity sector organizations, trade unions and supply industries, in addition to the AP government and the state administration itself. Together they provided for a highly stabilized collective with persuasive political and economic powers (Midttun, 1987).

6.2.1 Transforming the role of the state in the electricity sector

Erik Brofoss and Lars Evensen played important strategic roles in carrying out the new policy. Both stressed the need to increase export revenues and labor productivity in a situation with a tight labor market, and both favored large scale industries as the tool in this respect, in line with the perspectives outlined by the industry committee in London and in line with the role Norway had been given by the international program for reconstruction of the European economy; to produce metals to the European reconstruction.

NVE at the end of the war, was not a part of this new entrepreneurial collective. It rather reflected the unsuccessful direct state engagements in the electricity sector during the 1920's and -30's, and the national political confrontations with the German occupants and their electricity policy. The traditional market problems for state electricity, the downsizing of the direct state engagement, the dominance of Samkjøringen and the autonomy of local and regional cooperatives, had led to a rather disillusioned organization. In the discussions about what to do with the German investments in the large waterfalls Mår and Tyinn, NVE representatives argued that these waterfalls should be reserved for general supply purposes. In the case of Aura in Møre og Romsdal, they argued that the waterfall was too large and too expensive

to exploit and that resources rather should be invested into smaller waterfalls more suitable for general supply in the region. In all of these cases, NVE actively opposed to its minister Lars Evensen and the large scale industry ideas of the government (Thue, 1994:408-417).

In 1947, the government started re-shaping the NVE by appointing professor Fredrik Vogt as the new director general. Under his leadership the ideas developed in London during the war was forced through. The elder generation became pushed aside and a new generation of engineers was hired. Salaries were increased. In 1948 a new construction department was established which embarked on a number of large hydropower projects in an atmosphere of pioneer-ship, of “getting rid of the red tape in order to get the job done” kind of attitude. The NVE – just like Edison’s laboratories – also had an important role in producing human representations of the program, by educating delegates who entered managerial positions in the larger regional electricity companies through out the country.

In 1960 the NVE became reorganized and Halvard Roald took over as director general after Vogt. He came from a position as assistant minister⁴⁴ in the Ministry of Industry (ID), and had also served as the vise director general in the NVE since 1954 – a delegate from within the social democratic political governance system. At the same time, Sigurd Aalefjær, became managing director of a new department within NVE called Statkraftsverkene – responsible for the state’s direct engagement in the electricity sector.

The breakthrough for the large scale program apparently occurred through a “pragmatic” approach. However, the process was forcefully pushed by the government. The conflicts over the power from the state owned Mår waterfall, illustrates how the new state industrial policy became shaped. By the end of the war, the state confiscated the German ownership in Nordisk Lettmetall, which owned the industries planned to take delivery from the Mår-power, and cancelled the electricity concessions involved. The construction of the power plant and the transmission system had been headed by Norsk Hydro. The industries were handed over to Norsk Hydro in which the state through its German confiscations became an important share owner. Norsk Hydro was given the responsibility to complete the construction work on behalf of the state. The company then offered to take over a large share of the ownership in the Mår waterway, in line with the traditional industrial self-supply model for large scale industry. The idea was however rejected by the government, and the two parties negotiated a 50 year state electricity

⁴⁴ statssekretær

supply contract for one third of the new generating capacity based on a self-cost principle, with no price index regulations, but with adjustments for real generating costs. With this contract, the principles to be laid down in a number of later contracts between the state and power intensive industries had been established (Thue, 1994:395-399).

The institutionalization of self-cost based pricing in industrial contracts with below inflation adjustments of prices, gradually led to substantial economic losses to the NVE and to some of the regional electricity companies. These losses had to be covered through price increases to general supply purposes. Despite its traditional strong priority for general supply, the Parliament gradually was forced to increase consumer prices in order to balance the budgets of the NVE.

6.2.2 The general supply system; from local autonomy and business orientation to public sector integration and state-regional dominance

Even though the new state priority for large scale industry represented the most eye-catching development after the war, there was a strong support also for general supply. In large scale projects, a combination was necessary for financial reasons. Both state programs for rural electrification, the state credit policy and the new state generating capacity contributed substantially to a rapid increase in general supply and to completing electrification in rural areas. By 1955 around 500.000 of the by 1945 registered 700.000 households without or with insufficient supply of electricity, had been connected to the grid system by the help of 268 million NOK in state subsidies (ca. 2.14 billion NOK in 1990 money value). Ten years later, in 1965, another 309 million NOK had been used, and only 2650 registered individuals were without electricity (Hindrum, 1991:127).

To the local cooperative collectives, the situation had changed dramatically since the pre-war period. With a rapid increase in demand, the constraints now had become access to skilled labor, to capital and imported equipment. Allocations of these critical resources had become centralized under a tight state control regime. What had previously been organized rather autonomously by the local electricity companies, was now forced into a negotiating system in which the government and the state administration hold the upper hand. This stronger position of the state was also exploited to induce a larger degree of cooperation between local electricity companies. A number of new inter-municipal organizations became established with the mediation of NVE.

The larger projects also necessitated a radical increase in cross-regional cooperation in order to establish a sufficiently large market for the new generating capacity. The largest projects, like Tokke in Telemark and Sira-Kvina in Vest-Agder and Rogaland, typically involved cooperation between the state and a large number of local and regional electricity companies as well as negotiated agreements on where to locate new industries. Also regional companies signed industrial contracts at prices below production costs (Rinde, 1995:122). The new industry provided both direct and indirect employment and tax revenues, and electricity to a large extent came to be regarded as a public sector infrastructure investment and input factor to industrial and economic growth rather than as a separated economic area.

Four additional cross-regional cooperative organizations responsible for operating and coordinating generation and network balancing were established in addition to the already existing organization in the south-eastern region. The new “Samkjøringen organizations” were “Nordenfjeldske Kraftsamband” established in 1947, “Vestlandske Kraftsamband” in 1955, “Samkjøringen Nord-Norge” in 1960 and “Vest-Norges Samkjøringsselskap” in 1961. NVE became a member in all of these, and through its investments into high voltage transmission lines, it came to play a core role in the gradual merging of regional networks into one national grid system in which the state owned the dominant share of the national high voltage network, but where operational control was subordinated the cooperative organization of the generators. In this way, the general supply system developed into an integrated state-sector cooperative system with divisions of roles inherited from the conflicts over Nore in the late 1920’s.

During the 1950’s a new political program for structural reforms in the public sector emerged. It reflected the ambitions of social engineering program to rationalize the municipal sector. In 1960, the state initiated a reform in which the cities were included into the counties. It followed a municipal reform in 1957 in which a number of small municipalities were merged, and it was followed by a new wave of municipal restructuring in 1967 (NOU 1992:15). In a parliament report in 1959/60 on the organization of NVE⁴⁵, the question about major organizational reforms of the electricity sector was raised. In 1964 there was still 638 organizational entities within the electricity sector, most of them small distribution companies.

⁴⁵ St.prp. nr. 100 (1959-60)

6.2.3 The political shift to a right wing-center coalition government

The early 1960's represented the peak of the domination of the social democratic social engineering collective, with continuous rapid growth in the economy as well as rapid expansion of the welfare state. The social engineering program and the Norwegian corporate governance model had reached a stabilized state in which its different networks; interpersonal, institutional, financial, organizational, political, industrial, technological, international etc. had managed to produce substantial results. With the introduction of computers in the late 1960s, the economic governance tools were radically expanded into complex economic simulation and forecast models used by SSB, FD and the Norwegian Central Bank (NB). The energy policy was directed from within the core of the collective which hold command positions towards the electricity sector within the government, the NVE, the research institutions NTH, SINTEF/EFI and IFE, and the state research council NTNF. In the words of Atle Midttun, the power-segment represented a large, well organized institutional complex with wide political mandates and substantial economic and political weight within the production system, the financial system, the state administration, the regional administrations, the trade unions and the core educational- and research institutions (Midttun, 1987).

Politically, the situation changed during the 1960s. In 1961, the radical wing of the AP left the party and formed a new Socialist Peoples' Party (SF) with two representatives in parliament. This led to the first government crisis in 1962 and a short lived conservative government. In 1965, however, AP lost the parliament election and a coalition government was formed with participation from all the previous opposition parties; Høyre (H), Venstre (V), Kristelig Folkeparti (KrF) and Senterpartiet (SP). The coalition also won the election in 1969 and remained in government until 1971, when it broke apart over the EEC-membership issue.

The political change in government however, did not represent any radical change in economic policy at the time, but rather a relative shift in focus from state driven industrial growth and resource allocation to a larger emphasis on organizational efficiency. In 1968, professor in hydroelectric engineering, Vidkunn Hveding, took over as director general of the NVE, a position he hold until 1975. Hveding came to represent an important shift towards "electricity economics" which focussed primarily on external pricing principles and efficient internal organization. The shift occurred with the backing of the new H-KrF-V-SP coalition government.

In line with international developments and after the initial investments into two small atomic power research reactors in the late 1950, a strong program for introduction of atomic power was pushed also in Norway. In the first parliamentary report regarding the energy policy in 1970, the coalition government suggested to introduce thermal power based on atomic energy to the electricity system⁴⁶. However, the industry committee in parliament was skeptical and pointed to the need for a new atomic energy law if atomic energy was to be established⁴⁷. This led to the initial work on a new energy legislation.

The ambition to rationalize the organizational structure of the sector also increased through out the 1960s'. Where as Hveding represented a rather pragmatic attitude in favor of gradual voluntary mergers, others – like Siggurd Aalefjær in Statkraftsverkene – created plans for a state governed integration of the entire system. Also the atomic power plans put pressures in the direction of a centralization of organizational structures.

In the late 1960's three different lines of conflict between well organized entrepreneurial collectives emerged in relation to the electricity sector, which turned policy-making into a much more complex task. These were :

- 1) An emerging conflict between the social engineering collective with its atomic power and large scale hydro-power projects and the emerging environmental movement.
- 2) A renewed conflict between a much more ambitious state hierarchical collective primarily represented by NVE (Statkraftverkene and the E-directorate) and the local cooperatives over governance principles and organizational control in the sector.
- 3) A conflict between a program for allocative economic efficiency based on the new electricity economics introduced by Hveding and the energy intensive industry.

Together they came to represent a gradual and partial destabilization of the post-war social democratic social engineering program.

⁴⁶ St.meld. nr. 97 (1969-70)

⁴⁷ Innst. Storting nr. 222 (1970-71)

6.3 Destabilizing the post-war regime. Multiple frontlines, increased governance complexity and renewed hierarchical initiatives (1968-1980)

This fifth and final period of this historical background presentation covers a period of partial destabilization of the social engineering collective, forced by growing economic problems and emerging rival programs challenging the established order from multiple directions. Again, these developments were closely related to the emergence of similar programs internationally, to which the various Norwegian collectives were associated and from where they became influenced during the second half of the 1960's. With a large new post-war generation leaving the educational system under the impression of the Vietnam war, the national independence movements in the third world and the political dominance of the large scale social engineering collective, all kinds of rival programs which aimed at the re-making of society in some respect, gained momentum all over the western world. The general beliefs in the growth philosophy declined along with positivism in science. The dominance of those educated in the 1930s came to an end.

At the same time, economic problems gradually emerged. The rapid economic growth declined from 1968. Both expansionary state budgets and increased credits gradually led to a situation with a combination of inflation, government budget deficits and large state debt burdens in the 1970s. Keynesian economics also seemed to come to an end. Governments could not expand their budgets further and credits could apparently not be expanded to boost growth without fuelling inflation. In 1972, the Bretton Woods exchange rate regime broke down. The euro-dollar market outside the control of the Federal Reserve or any other government, made it impossible to control credit while maintaining political governance of interest rates. Both economists and governments had to search for alternative approaches in order to cope with the situation.

In the US, Friedman's monetary theory offered a solution in line with traditional American ideology; a return to a competitive market policy and hands off by the government. The University of Chicago became the new Mecca for economists. In England, Hayek's ideas about self-organized markets provided similar thoughts – developed and argued during 25 years of political exile for the liberal market theory. With the Nobel prizes to Hayek in 1974 and Friedman in 1976, the “neo-liberal” program demonstrated its rapid recovery within the international community of economists. In Norway, Farmand and Trygve J. B. Hoff transmitted these ideas and gradually increased its audience – not at least among a growing network of market economic advocates in the new right wing party

“Fremskrittspartiet”, which challenged the conservative party Høyre from the market oriented side.

The Soviet Union lagged substantially behind economically during the 1960’s - in particular in consumer markets. Also the socialist experiments in third world countries in the early 1970s turned out to produce devastating results. When also the state owned large scale industries in Western Europe entered substantial economic problems and had to be closed down at a large scale, the socialist alternative lost much of its credibility. “More markets – less state” became a powerful slogan for the neo-liberal entrepreneurial collectives, which expanded into core institutional positions at national as well as international levels.

Another generation of economic researchers became educated by the neo-liberal program, and a massive influx of research interest fuelled a rapid expansion of economic theory and business economics; strategy, organizational theory, financial economics, theories of the firm etc.. This process added new concepts, loads and delegates to the neo-liberal economic program and provided politicians with new operational alternatives for economic governance. In Europe, the organizations which had been set up to increase economic integration and avoid nationalistic expansion; the EEC, the OECD and the EFTA, quickly became dominated by the neo-liberal program and became “educational centers” for civil servants from the various states. World wide, the IMF and the World Bank became important commanding heights for the advancement of the neo-liberal economic program.

Within the energy sector however, the large scale social engineering collective pushed for new large atomic power projects, but faced a rapidly growing anti-nuclear movement. After the accident at the Three Mile Island atomic power plant in Pennsylvania in 1977, the atomic power program rapidly broke down in all western countries except France. The technology was apparently not as safe as claimed by the engineers, although the engineers maintained that the severity of the accident was well within predictions for accident frequency. Confidence in the technology broke down and the social engineering collective faced its perhaps most important defeat⁴⁸.

⁴⁸ The Three Mile Island power plant in Harrisburg, Pennsylvania was owned by Edison Metropolitan (New York City) – the company which emerged out of the company Edison created to construct the Pearl Street central station project in the early 1880s. The accident illustrates a case in which a world wide strong and durable system of power broke down through a dramatic breakdown of one of its core elements – the atomic plant control system.

During the 1970s, the environmental issue became forced to the focus of the energy policy in countries like Germany, Holland, Sweden, Denmark and Norway, and gradually established political-institutional governance systems in accordance with its own rationality concepts - on top of the technical-economic governance systems. The Norwegian environmental movement concentrated on the protection of remaining waterfalls, which led to the establishing of the Ministry for Environment in 1972. The new ministry became affiliated with the environmentalist collective, and represented the collective within the state administration. With the “joint plan for remaining waterfalls” sanctioned by parliament in 1986, the environmentalist reframing and remaking of the electricity sector had largely been completed. In the broader sense it had contributed to a strengthening of the state hierarchical governance structure by including all remaining waterfalls into one national plan. The inclusion of the environmental interests into the governance system however, made the concession processes more complex, more time-consuming and politically far less predictable.

6.3.1 Norway: A separated pathway?

In Norway, developments came to follow a separate pathway during the 1970s, caused by the rejection of the EEC membership in the 1972 referendum and the growing oil economy. The defeat for the supporters of EEC-membership in the 1972 referendum, had important political implications. Once again by mobilizing against the loss of national political control, local and regional collectives reinforced their political legitimacy and powers at the expense of centralized state powers. To the political elite, the outcome was a political embarrassment in face of their European counterparts. The result was a destabilization of the internationally oriented social engineering collective and a substantial weakening of the traditional political elite, its industrial, scientific and political networks, its governance technologies and its state powers. In the 1973 parliament election, a united left wing Sosialistisk Venstreparti (SV) radically improved its parliamentary representation. The minority AP government under Trygve Bratteli, only had a majority of 68 representatives, including 13 from SV, over 67 from the opposition. This provided for a weak government dominated by trade unions, district interests and sector economic industries, which led to what may be seen as a peak in the “negotiated economy” between the state and its many civil society counterparts.

The oil crisis in 1973 contributed to the shift in the orientation of the energy policy from resource mobilization towards a more resource allocative perspective. But, the discovery of oil and gas in the North Sea on the other hand, turned the country into an extremely comfortable situation in terms of future energy supply and economic outlooks. The availability of large oil and gas reserves took what might have remained of power out of the atomic energy program and shifted attention to gas based thermal power as the future source for new energy supply.

The new petroleum sector became organized by the state in a concession system similar to what had been established in the electricity sector in between 1906 and 1917. This provided for a tight national control over the large resources. Under the AP governments of the 1970's, the traditional social engineering collective managed to gain control over the structuring of the oil sector. The state owned company Statoil became the core political instrument in building up a large, competent and dynamic national oil and gas industry, which also gradually turned the company into the dominant actor in the North Sea on the Norwegian side.

The financial credibility of the new oil-state and the prospects for large future incomes, permitted the government to carry out a strong Keynesian counter-cyclical economic policy when the economic problems increased during the 1970s. State owned industries were kept alive by state subsidies, the ship building industries received additional support as well as other sectors of the export oriented or import competing economy. The government also presented an ambitious program for "a qualitatively better society", a program for decentralization of governance responsibilities to counties and municipalities as well as several other fairly costly economic reforms. By 1977-78, the aggregated effects of this policy led to a severe economic crisis with increased inflation, large government budget deficits, a rapidly growing national trade deficit and pressures on the exchange rate. Where as other countries had been forced to restructure their industries from around 1975, Norway managed to maintain full employment and to avoid major economic restructuring until 1978/79. The result was a radical decline in international competitiveness, which had to be off-set by successive exchange rate devaluation.

6.3.2 The regulated national electricity trade system and the occasional power market

In 1970, the final merging of the northern electricity system with the southern, completed the operational integration of the national grid system⁴⁹. From now on, the entire national hydropower system could be technically and economically coordinated through a unified network system under the operational control of the cooperative organization of electricity generators; “Samkjøringen av kraftselskaper i Norge” established January 1st 1971. An internal market for “occasional power” became established on a common carrier and third party access basis, organized as a centralized institutional exchange market for short term contracts. Only generators were permitted to trade directly in the market. This early construction of an institutionalized market for electricity came to represent one of the starting points of the market reform process, and will be discussed in more detail later on.

The substantial economic risks involved in the hydropower system which largely result from the unpredictability in precipitation and temperatures from year to year and the bulky addition of new capacity, were basically managed at a cooperative and centralized level, through the joint policy of NVE and Samkjøringen. The major elements in this policy were the separation of cost recovery in the “firm power market” from marked balancing in the “occasional power market”, the establishing of sufficiently large reservoirs, the establishing of a separated and well defined market for consumer contracts with low security of supply standards and flexible prices, and the establishing of a trade system with Sweden and Denmark operated by a NVE/Statskraftverkene national trade monopoly. Over time, generators in Sweden and Denmark came to play the most important role in supply and demand side management of the Norwegian hydropower system. The following table 6.1. shows the relationship between expected operational production capacity, actual production, gross consumption and net export in the years 1975 through 1985.

Table 6.1. Production capacity, actual production, gross consumption and net. export, 1975-1985

	<i>Expected operational capacity,</i>	<i>Production</i>	<i>Gross consumption</i>	<i>Net export</i>
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⁴⁹ Only operational matters were integrated. Ownership to various power lines etc. was and still is separated.

	<i>pr. 01.01</i>			
1975	80 280	77 486	71 866	5 620
1976	81 161	82 133	75 496	6 637
1977	81 813	72 432	73 515	- 1 083
1978	83 145	80 997	77 592	3 405
1979	85 080	89 123	84 472	4 651
1980	87 072	84 099	83 637	462
1981	89 676	93 397	88 168	5 229
1982	94 661	93 156	87 094	6 062
1983	96 963	106 369	92 953	13 416
1984	99 208	106 666	98 396	8 279
1985	99 696	103 292	102 748	544

Source, Central Statistical Bureau (SSB), Historical Statistics, 1992

We note the substantial overcapacity by 1975 (10%) as compared to gross consumption, which was picked up by demand already by 1979. Then, production capacity increased rapidly in between 1979 and 1984. The two years 1983 and 1984 were unusually wet years with substantial net export. The new capacity however, is picked up by consumption already in 1984.

Through 1981-84, the clear cut separation between the two parts of the trade system gradually weakened as a result of the large increase in generating capacity caused firstly by investments and then by weather conditions. As a result, prices in the occasional power market tended to be substantially lower over time than in the firm power contracts, and electricity companies to an increasing extent turned to the occasional power market in order to cover their supply obligations. As a result, there was a growing tension within the sector between those who supported an increased role for the occasional power market and those who pushed for stronger state control in order to constrain the ability to cover supply obligations through the short term market – in order to maintain prices sufficiently high to cover investment and generating costs.

The state support for regional security of supply obligations, the increased prices in Statkraft contracts to general supply and the continuous push from large scale industries to increase electricity generating capacity, contributed to the growth in generating capacity within the local and regional general supply systems as well as by Statkraftverkene. The large expansion of the generating capacity in the 1970's and early -80's occurred despite the lack of a solid economic foundation (Atle Midttun 1987). To a substantial degree it was an effect of the long lead times in large hydro-power projects, which had not become shorter with the more complex governance situation in the 1970's. With lead times up to 10 years from initial planning to a completed

hydropower project, the ambitious growth oriented policy in the early 1970s came to decide upon the actual increases in capacity in the early 1980s.

6.4 *Historical roots of and points of departure for the electricity market reform*

The presentation reveals an economic sector with substantial complexity. There are however, important trajectories of development which can be identified as major constituents of what has become the major unique features of the Norwegian electricity system; the combination of elements which both resemble substantial locked in powers and which may have provided the starting points for an alternative approach exactly in this case, rather than in some other country. I have shown that the sector emerged within an overall program for national resource control and economic modernization shaped under the leadership of Gunnar Knudsen, which became institutionalized and locked in as the fundamental governance system during the concession law process between 1906 and 1917.

History also demonstrates how the sector has been torn between a programmatic cooperative collective largely associated with a small scale vision of modernization which came to dominate the general supply industry at the early stage, and a state hierarchical collective for national, political and professional control and large scale modernization which mainly emerged in the wake of the two world wars, and with the growth of state capacities and resources. We have seen that the hierarchical approach experienced an important early defeat in 1922 and that the cooperative alternative which grew strong from a unique 19th century municipal legislation, reinforced its powers through the 1920s, during the war and after the 1972 referendum over EEC membership. It also managed to defend a relatively strong position for its major federative organization Samkjøringen in the national electricity sector governance system.

The influences from municipalities and their federative, cooperative systems prevented radical hierarchical restructuring of the electricity sector, which left the sector with a relatively large number of “semi-autonomous” generators and distributors. It also left professional economic and state governance ambitions with substantial difficulties in directing and controlling local economic decisions and behaviors. The rationality of the Norwegian electricity sector from this point of view, was rather unimpressive.

History also reveals to us a very interesting process of industrial transformation directed by a dedicated post-war entrepreneurial collective

who represented a radical large scale program for economic growth. I have shortly referred how this collective became established and have traced some of its roots back into the 1930s, in the American TVA project and the American new deal program, in the state hierarchical political and economic approaches of the 1930s, in war experiences and in close relationships to similar programs elsewhere. I have indicated how it captured the major commanding heights within the electricity sector – despite confrontations with a more popular and traditional small scale cooperative approach. And, we have seen that it enrolled the cooperative systems, gradually transformed them and came to dominate developments through industrial initiatives, resource control, partial re-configuration of the sector and education and distribution of representatives through out the industry.

From a situation of peaceful co-existence and mutual reinforcement between the state hierarchical and the local cooperative rivals, much more radical hierarchical ambitions politically as well as within the NVE in the 1960s, pointed at the apparently unresolved controversy between the two alternative approaches; the bottom up federative program and the top down state hierarchical. In particular the hierarchical side was not satisfied with the current structuring of the industry and with the ambitions of the opponent to maintain a structural domination in the future. Both however, had established strong institutional lock-ins in different parts of the sector which tended to turn the rivalry into a trench warfare. This might have created opportunities for a third alternative, which certainly however, would have to associate with the two locked-in collectives in such a way as to make them comply with a fundamentally different approach, in order to prevent devastating opposition and to create a significant political breakthrough.

The authority and legitimacy of the sector had also been weakened by economic problems, by the efficiency problems implicit in the “negotiated economy” under weak governments, by attacks from the environmental movement and from critical economists, and from the opposition from the new post-war generation against rapid economic growth as a legitimate political program. The powers of the post-war entrepreneurial collective piece by piece declined as its advocates were unable to cope with these much more diverse and complex political challenges.

The political shift in 1965, the appointment of Vidkunn Hveding as the director general of the NVE, the new organized market for power exchange between generators, the 1970- energy report from the coalition government which pointed at a deeper concern with “external pricing efficiency and internal organizational efficiency” and the demand from parliament for a new energy law in order to regulate atomic energy systems, all appear to represent possible points of entrance for further investigations into the roots

of the market reform. These events in Norway were followed by significant shifts in economic theory orientation within the international economics community, from well established hierarchical state regulatory approaches to general market equilibrium theory. This change occurred both in the area of macro economic theory and in the area of sector economic regulation and control theory. These developments within economic theorizing and their possible links to an emerging electricity market reform collective, is also an obvious point of entrance.

Finally, the emerging over-capacity in the early 1980s and the tensions this created within the sector provided for vested interest among generators and distributors who were in net purchasing situations, to support a more flexible market system by which they could purchase electricity from other generators at marginal cost rather than the higher, politically set prices and contractual conditions in long term contracts.

Part III:

Pathways to the electricity market reform

Introduction

The objective of this third part of the analysis is to investigate in some depth different sources of the electricity market reform and major elements in the emerging market reform collective – starting with those identified in the historical presentation. In accordance with the research strategy outlined, I will aim at triangulating the emergence of an entrepreneurial electricity market reform collective by obtaining descriptions of the activities of different collectives, actors and their collective things, and of historical circumstances which played essential roles in providing for its emergence. I will then take these descriptions further into explanations about how and why the market reform alternative came to represent a viable alternative for electricity sector re-orientation and restructuring.

As the reader has certainly recognized by now, this exercise is not about extracting analytical typologies about structural, institutional, cognitive, individual or other types of variables - which is typical for much of the economic sociological literature. It is about providing a dynamic account of why and how something expands from a conceptualization to an ontological state of existence, of why and how some specific economic program becomes reality through the shaping and building of a sufficiently capable entrepreneurial collective to support it, through controversies and associations with historical- as well as rival entrepreneurial collectives, and through the ability of the entrepreneurial collective to expand by enrolling elements of its environment in accordance with its program and its “rules and roles of the game model”. This necessitates an in essence historical analytical mode of presentation which however is not similar to a historicist type of exercise in which every story is simply unique. On the contrary, the ambition is theoretical and closely in line with the agenda for economic sociology formulated by Granovetter:

“.. the agenda that follows from my conception of economic sociology is one that aims to produce a theoretical argument consistent with the high level of contingency I see operating in the actual construction of economic institutions, but to do so without sliding down the slippery slope into historicism. This is not the only possible agenda for economic sociology, but it is a broad and challenging one that I claim has great potential to add a new dimension to our understanding of economic life.” (Granovetter, 1990:107)

First, I will investigate further into the immediate circumstances which may have left some space open to a radical market alternative. We need to obtain a much sharper understanding of what the alternatives were at the time, what their collectives did to advance their models for the reshaping of the industry, what arguments they mobilized and why they apparently did not succeed in creating decisive breakthroughs - which might possibly have locked the industry into some other pathway of developments into the 1990s.

Second, we need to identify those elements which came to link up with the electricity market reform collective and thereby to add capabilities and powers to its program. From where did it gain such strengths? As a crude approximation, I will trace international collectives of actors engaged in similar programs for the reshaping of the economy, and follow their influences back to Norway – to economic and institutional change processes prior to the electricity market reform, and possibly to the electricity market reform collective itself. First and foremost, this exercise will concentrate on developments within economics and on the wave of economic reforms internationally associated with “economic deregulation” in the late 1970s and the 1980s.

Third, I will describe in brief the actual emergence of the electricity market reform collective at the Center for Applied Research in Bergen, its immediate roots in broader scientific research programs and early research projects. I will trace the early shaping of its program and its main simplified elements, its relations to the electricity sector and the early construction of institutional and organizational networks into which the program became embedded. What did the actors involved do to advance their early program into a viable alternative for the transformation of the entire electricity industry?

Finally, because the market reform program became mobilized as a political-administrative alternative in between 1986 and 1989 under a Labor Party government, I will shift focus to a different pathway of developments which emerged from efforts to modernize the Labor Party after the party had regained government control in 1986. What was the content of this modernization approach? What was the role of economics as a scientific program in this change process? Who were the major actors and were any of these substantially involved with the electricity market reform at an early stage? What were the links between the labor party modernization program and the electricity market reform collective at the SAF? Where there major differences between core concepts within the modernization program and the core of the market reform program?

This part of the analysis contains the following four chapters:

Chapter 7:

Rival approaches to an efficient electricity industry. Why they did not succeed

Chapter 8:

Return to markets. Re-orienting economics and reshaping economies

Chapter 9:

Einar Hope and the entrepreneurial electricity market reform collective

Chapter 10:

Tormod Hermansen, the social democratic modernization program and the links to the electricity market reform collective at SAF

These four different pieces of empirical analysis round up the discussion of how and why the electricity market reform emerged as a viable alternative for electricity sector reform in Norway. How it became stabilized as a real life system, is the topic of part IV.

7 Rival approaches to an efficient electricity industry. Why they did not succeed.

We have now identified the early electricity economic program of Vidkunn Hveding as an interesting point of departure for closer inspection. What were the core concepts of his program? What made up the Hveding collective and its authority? Who were his allies? How did it relate to the Norwegian economics profession? Where there alternative economic approaches?

Starting from these questions, I will investigate into the major concepts of electricity economics internationally and trace the major elements which was put together in Hveding's program. What was his concept of an efficiently structured and governed electricity system? I will also present some of the systems which was created and established within the electricity sector as essential elements of the Hveding collective's efforts to reshape the industry; the EFI simulation model, the "occasional power market" and the linking up of the Norwegian hydropower system with Danish thermal power plants.

Of particular interest to the discussion, is to see how Hveding's economic concepts were responded to by Norwegian economists at the University of Oslo (UiO) and the Norwegian School of Business Administration in Bergen (NHH). Where there important differences? What roles did they play in Hveding's efforts to create a significant breakthrough for scientific economic principles within the sector? Why, and in what respect, didn't he succeed – leaving his position as NVE director general in frustration in 1975? We also need to clarify the relations between the Hveding collective and a program for hierarchical restructuring of the electricity sector and the atomic energy program at the time. Were these essential elements in Hveding's program, or did they rather represent separated trajectories which had been wrapped together in the 1970 energy program from the government? What happened after Hveding withdrew? Did his project loose its driving force? In that case – who gained the initiative? As the atomic power program already approached a dead end in Norway by 1975, it turned out to be the hierarchical restructuring program who gained the initiative, first and foremost associated with Statkraftverkene and the E-directorate within the NVE – and with their managerial leaders Asbjørn Vinjar, Gunnar Vatten and Erling Diesen. What did these institutions and actors do to turn their ambitious program into reality and why, apparently, didn't they succeed either?

7.1 *Vidkunn Hveding and the system design/electricity economic program*

The first important work on electricity economics in Norway was initiated in the mid-1960s by The State Energy Council⁵⁰ - an advisory board under the Ministry of Industry with a number of very influential members, headed by the economist Knut Getz Wold. In 1966, Vidkunn Hveding, professor in hydroelectric engineering at NTH, became engaged by the council to direct a broad economic analysis of the energy sector. Hydroelectric engineering is an area of engineering primarily concerned with electricity system design. Two young economists, Kristian Knudsen and Hans Holdahl, were also employed. Their report “Report regarding Norway’s energy supply industry⁵¹” was published in 1969 and came to represent a new direction for the electricity sector based on an introduction of the international scientific tradition in electricity economics which thereby challenged the traditional pragmatic mix of private business-, cooperative- and public sector “budget balancing” and “average cost pricing” practices.

By giving a clear cut priority to economic efficiency, the economic program also to some extent confronted the many political objectives at multiple political/administrative levels which dominated the established system – like district policy, employment policy, redistribution policy, large scale industrial growth etc. Economic efficiency became forced to the focus.

The report presented by Hveding, established what can be seen as a blueprint for a scientific economic program for the electricity sector politically adopted by and presented by the H-V-SP-KrF coalition government (1965-71) in its 1970 energy report to parliament⁵² (Thue, 1996:96). The Hveding report argued strongly for the introduction of thermal power to the Norwegian hydro-power system – either through investments in new power plants or through a cable across Skagerak to the Danish thermal power system. In the government report however, atomic power - which expanded rapidly in Europe at the time – was moved to the focus as the alternative for the future energy supply – pushed by the Institute for Atomic Energy (IFA) and its social democratic social engineers such as Gunnar Randers, Finn Lied and Hans Christian Hauge. The government report also argued strongly that

⁵⁰ Statens Energiråd

⁵¹ Utredning vedrørende Norges energiforsyning

⁵² St. meld. nr. 97: 1969/70

efforts should be increased to restructure the sector by merging the many small distribution companies into larger entities. This point represented a continuation of a restructuring program which had been introduced by the AP government in 1960. These three purposes; introduction of scientific economic pricing and planning principles, thermal power and organizational restructuring, came to dominate the agenda – in addition to the environmental issue – until the early 1980s.

Before being appointed professor of hydropower engineering at NTH in 1958, Hveding had been working on hydropower projects in Norway since 1946, and for the three last years in Ethiopia and Brazil. With the reorganization of NVE in 1960-61, he was offered the post of deputy director general⁵³. Finding that the post had been made effectively redundant with the same organization, he went abroad again in 1963, this time to work for the Kuwait Fund, a fund established on the pattern of the World Bank for financing major industry and infrastructure projects in the Arab world. The World Bank had been established right after the war and equipped with a development vision which had also been inspired from the American Tennessee Valley Authority project (TVA). Through the World Bank this vision was advocated to development countries across the world, part through World Bank lending and part through local or regional development banks set up with assistance from the Bank – such as the Kuwait Fund. Just like Fredrik Vogt, his student and colleague Hveding was convincingly introduced to this vision of economic organization and industrial and economic development. Being a member of Høyre, Hveding also became intimately associated with the 1965 coalition government on his return from Kuwait. He was acting permanent secretary of the Ministry of Industry in 1967, but moved to the position as director general of the NVE after Halvard Roald in 1968. By these events, his new economic program experienced a rapid breakthrough into command positions within the electricity sector⁵⁴.

Where as Vogt had focussed on the industrial growth aspect and became an important actor in the post-war social democratic governance regime, Hveding came to influence events after that regime had been able to demonstrate its results. And he was not too impressed. *“The large scale industries gained money to their owners, the state gained some, but their contributions to their districts were minor. The large iron and steel plant in*

⁵³ “Administrerende direktør og generaldirektørens stedfortreder”

⁵⁴ Interview with and comments from Vidkunn Hveding, 25.03.98.

Mo i Rana headed towards a close down from the very beginning” (Hveding, 25.03.98).

He caught interest in and became influenced by the liberal market economic ideas advocated by Trygve Hoff and Farmand, and he became one of the most prominent political opponents to the strong industrial role of the state in the post-war social democratic regime. In particular the new state-owned steel and iron-plant in Mo i Rana and the associated very generous state-electricity contracts, became a key target for economic critique from Farmand, Høyre in parliament - and from Hveding.

A very significant influence came through the economic principles and managerial practices which Hveding learned from the “World Bank blueprint” organization in Kuwait⁵⁵ and from his close links to leading World Bank administrators and professionals in the years to follow⁵⁶.

Working in Kuwait as an engineer on a team with brilliant Arab economists who had however no experience with real projects, Hveding had felt obliged to educate himself in economics too. During his reading he was surprised to learn from American journals of the considerable work on electricity economics that had been done by French engineers and economists at the EdF during the 1940s, unknown to the economics profession at large till after the war and adopted by American researchers only in the early 1960s. Central to the work done at EdF was the logic of basing substitution of plant or resources on their marginal rather than average cost, a thinking which had already gained some currency among Scandinavian engineers. Hveding also observed that this led straight into the shadow price planning theories advanced by Oskar Lange.

Having acquired these new economic theories – and through the initiative of the State Energy Council – the engineer Hveding became the one to introduce electricity economics to Norway and to reframe the electricity sector policy of the state from the perspective of economic theories.

From the perspective of Hveding, the role of the new economic theory was to improve the economic efficiency of the electricity system as a whole through efficient internal organization and correct marginal cost pricing, the

⁵⁵ Interview with Hveding, 18.03.99

⁵⁶ The World Bank participated in financing the large Tokke hydro power project in the early 1970s, when Hveding was director general in NVE. This was the last project the World Bank financed in industrialized countries.

quality of investment decisions and the planning capability of the administratively coordinated national system. It also offered possibilities for designing economic systems which would “force” local actors to behave more rationally, and Hveding wanted to explore these possibilities further by working with economists on these issues. He was also eager to present the EdF electricity economic theory to the Norwegian economic profession in order to strengthen professional support for his program. This however, at least in part turned out to become a frustrating confrontation with mixed implications.

7.1.1 The international roots of electricity economics

Internationally, electricity economics mainly grew out of three different national traditions, the American, the British and the French, of which the theoretical work which had been done by French economist and engineers at EdF during the 1940's and -50's, turned out to be the most complete (Joskow, 1976:197). During the early 1960's, the French contributions became integrated within the English speaking research community and gradually developed into a more unified international area of theorizing. Because the EdF economic research program was in large initiated and dominated by engineers who were dedicated specifically towards overall system design and operational governance of the electricity system, many important papers appeared in technological journals, and in particular in those directed towards public utility sectors (Drèze, 1965). The fact that electricity economics was introduced to Norway through an educated engineer rather than an economist was accordingly not accidental. Neither was the close coupling between the welfare economic theory developed by the French mining engineer and economist Maurice Allais and the electricity economics developed at EdF, as the new welfare theory became the basic framework of the national economic reconstruction program in post-war France.

The American approach had been to develop a pricing theory for non-storable commodities with periodic demand within the framework of a given fairly homogenous production capacity. Its specific orientation can largely be seen as a result of the rapidly growing legalistic and price-oriented regulatory system which came to dominate the US governance system after the mid-1930s, where electric utility companies typically were private profit oriented monopolies largely shaped by the model of Insull's Chicago Edison system. The electricity economic theory partly served as an approach to peak load management intended to smooth out production and thereby reduce operating costs, and partly it served to structure and regulate pricing practices, according to which for instance peak-users should pay for the total peak-load costs where as off-peak users should only pay for operational

costs. Cost recovery was at the core rather than the marginal cost based price theory. In short, the American approach could be labeled supply and demand side management and cost recovery based monopoly regulation.

The British approach was that of supply side management in a more complex technological system which developed further into the details of efficient “merit order” management in systems with a variety of technologies. The approach relaxed the assumption about homogenous production capacity and recognized both that the efficient provision of a periodic demand will usually imply a mix of different types of capacities with different marginal operating and investment costs, and that the efficient management of a system necessitated availability of reserve capacities as well as periods for maintenance. Fluctuations in demand and supply would accordingly have to be coordinated (Turvey, 1967). Because the Norwegian system is entirely hydro-based, the British contributions were not that relevant. The core of the Norwegian challenge was rather the dynamic character of the pricing problem under substantial uncertainty about available energy resources within the system (stored water), which characterizes the pure hydropower system.

The French approach emerged within the context of the reconstruction program after the war and the row of nationalized industries and utility sectors which became coordinated within a strong and elitist system of national planning quite similar to the ideas presented by Lange. The development of the theory by the staff at EdF was framed by the welfare theory developed by Maurice Allais and the national planning approach affiliated with Jean Monnet, which aimed at bringing France up to a leading industrial and economic welfare position. As a result, the EdF theory became intimately related to the relationship between pricing policy and investment policy in the context of the efficient operation of an integrated national public enterprise. The theoretical methodology encompassed both the American and the British approaches to supply- and demand side peak load management and made further advances in several directions. One of these was its recognition of the role of uncertainty in both demand and supply for pricing, network design, investments and operation. Another was their inclusion of curtailment costs or rationing costs to consumers when loads occasionally had to be curtailed, which also had implications for pricing and investment rules. And thirdly, the EdF gave further considerations to the transmission and distribution systems and analyzed in detail the economic characteristics of the various parts of the system and derived appropriate pricing and investment rules (Joskow, 1976:199-200).

A fundamental contribution was done by Pierre Massé, a close colleague of Maurice Allais. He formulated the optimal decision rule for operating a

hydroelectric dam and the affiliated principles of dynamic programming, core properties of stochastic marginal analysis, problems of constrained optimization and other essential mathematical and theoretical contributions which linked operational research on electricity systems to advanced economic analysis. These and other theoretical contributions were taken up by researchers at EdF who contributed with numerous specific studies. The French marginalist program grew rapidly on the outside of main stream academic economics in France at the time, in the interaction between the French national planning system, a few outstanding mathematically oriented academics such as Allais and Massé and the staff of researchers within the various nationalized state industries dominated by engineers with substantial mathematical training from the French elite technological universities (Drèze, 1963).

From France, the EdF theory spread to other countries in Europe – among them Sweden, from where both theoretical knowledge and practical experiences could be gathered by Hveding and those who engaged in applying the theory to the Norwegian electricity system.

7.1.2 The creation of an internal competitive market for electricity generators

Equipped with the new economic approach and his system design professional competence, Hveding introduced a re-framing of the sector governance system. Each investment project should no longer be calculated as an autonomous project, but as an integrated part of the entire national electricity system. This turned the overall design of the system into focus. Efficient coordination of the entire system and the quality of marginal investments became important, as projects differed in their contributions to the overall efficiency of the system. This turned Hveding's attention in three directions: Firstly, towards what could be achieved by introducing thermal power to the 100% hydro-power based system, secondly towards ranking new hydropower projects according to their system contribution characteristics, and thirdly, towards what could be achieved from an efficient system for short term power exchange across regions with statistical differences in precipitation and variations in reservoir capacities. These elements were important technical and governance system elements in a network system which we may denote "the Hveding collective". Each of these elements shaped networks and events within the sector in line with the new framing. In the world model surrounding the core concept of the program, the dominant command position was that of the system planner, where as both economic theory, sector actors and technical or institutional governance systems were given the more supportive roles.

His first publication on his approach was a paper denoted “Digital simulation techniques in power system design” (Hveding, 1968) in which he outlined the principles for a numeric simulation-model for the hydropower system which later became known as the EFI-model. The model became a very useful and powerful instrument to system planners as well as to electricity companies and network operators. With modifications and substantial upgrading it is still used by practitioners within the electricity system. Simulations by the model showed that substantial economic gains would follow from an efficient short term trade system and from the introduction of thermal power to the system. These gains became known under the label “joint operation gains”⁵⁷.

In Sweden the two engineers Sven Stage and Yngve Larsson had done some early work on the EdF hydropower system theory and came to influence Hveding’s work. Larsson advised Hveding on how to construct a numerical simulation model rather than a statistical model, and Stage demonstrated to Hveding by the use of marginal cost theory, that thermal power plants would never be used for peak-load purposes if introduced to a hydro-power system. This followed because if the price approached marginal costs in a thermal power plant, it would be more economic to produce thermal power at full capacity and then use hydro-power for peak-load purposes⁵⁸. These insights became essential elements in Hveding’s new electricity system design approach.

From the insights obtained from his simulation model, and already before taking over as the new director general of the NVE in 1968, Hveding argued that the unification of the national grid system should be followed by the establishing of an organized market system for short term trade with electricity between generators. One of the essential problems in the hydro-power system which had been addressed by the EdF, was the stochastic variation in precipitation across regions and across seasons and years. Each individual dam would have a stochastic variation much larger than the aggregated system. In order to increase the amount of power which could be produced with high security of supply standards, all the reservoirs had to be coordinated. In the centralized EdF system, this could be done by calculating the marginal storage value (shadow prices) in each dam, rank all the dams in accordance with their marginal values and then command those with the lower values to produce before those with the higher values. This would

⁵⁷ “samkjøringsgevinsten”, my translation

⁵⁸ Interview with Hveding, 18.03.99

correspond to an efficient “imitated” market as suggested for instance by Oscar Lange.

In the Norwegian case, the hierarchical option was not plausible. The solution to the problem advocated by Hveding, was to establish a real market in accordance with economic theory and with the standard institutional arrangements needed for an efficient and practical trading system. To calculate marginal storage values would then remain a local responsibility as well as the decision whether to store or produce at the margin in a straight forward market system.

Such an internal competitive market system was established after the final merging of the northern electricity network with the southern in 1970, and after substantial pressures from Hveding and the NVE on Samkjøringen to create it. In 1971 - after three-four years of argument - NVE director general Hveding had to put substantial pressures on a grudging Samkjøringen to create an exchange system through which the generators could trade electricity with each other based on a single market price. Pressures were also mobilized through the parliament which criticized Samkjøring for not utilizing national resources efficiently, and through Statkraftverkene as a member of Samkjøringen. To Hveding’s apparent surprise, the system became operational only a few months later, from July 5th 1971, and was denoted “the occasional power market”⁵⁹ (Barth Jacobsen, 1998: 136)

Samkjøringen had been arguing for a different system based on bilateral power exchange in line with practices in other countries and similar to the contractual arrangements for longer term contracts. As it turned out, Norway already from 1971 came to establish a unique “ideal” market system for short term electricity trade within the central station system, with third party access and common carrier principles within the high voltage national grid system. (Within the regional and local networks however, each network owner controlled access). Over the years, the new market system came to represent approximately 10% of the total volume traded in the Norwegian electricity system.

The presentation demonstrates that the new market system was not something which “emerged in some natural way” from within the sector – for instance as a consequence of the merging of the regional high voltage systems or from the economic interests of individual generators. Rather, it was constructed through the application of economic theory, system design

⁵⁹ Tilfeldigkraft markedet

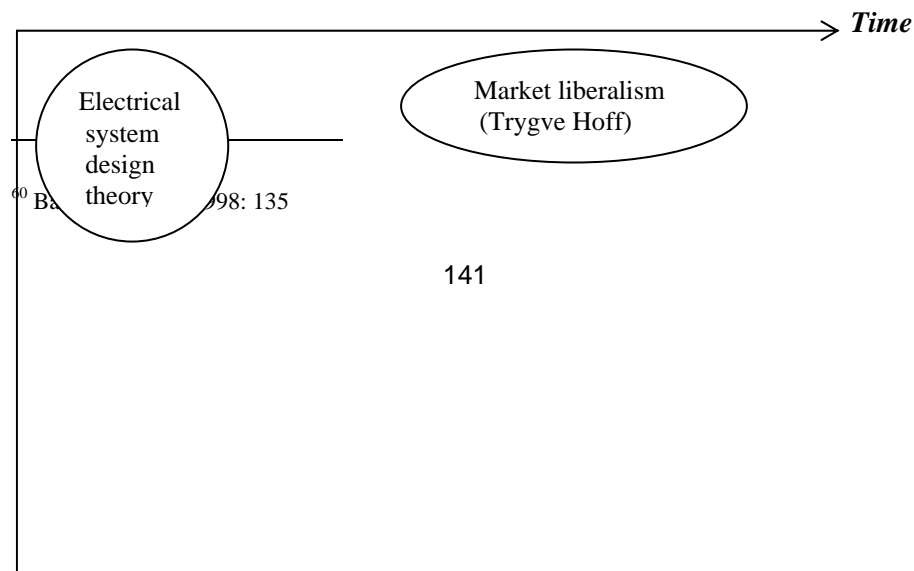
theory and new governance technologies by actors engaged in re-framing and re-configuring the industry from the basis of a specific scientific reform program. The merging of the system into one national grid system, however, provided a “window of opportunity” for creating such a system – by overthrowing traditional practices and resistance from within the sector.

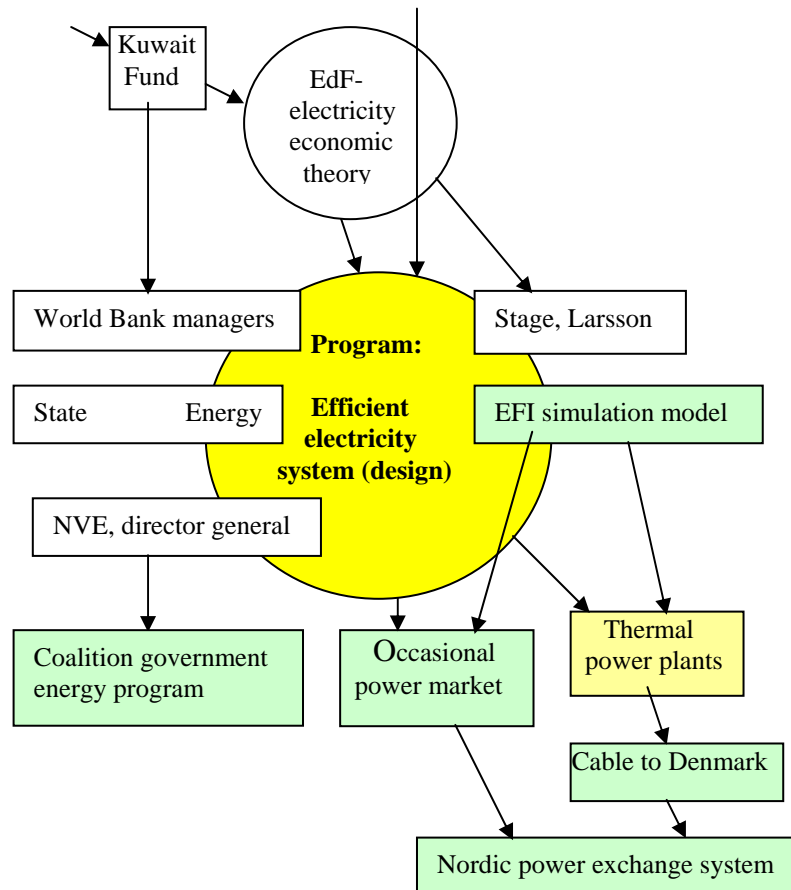
The creation of the new market was done by establishing a very simple exchange institution with standardized contracts for a homogenous commodity, in which the generators could engage in an anonymous auction which externalized social networks or other links between the buyers and the sellers. Nothing but the price, the calculated marginal value of stored water and the expected future demand remained within the relevant context of decision-making.

The initial institutional arrangements were primitive by any comparison to other organized exchange markets. There was only a weekly organized auction organized over telephone communication and with manual calculation of market equilibrium prices. There was only one type of contracts; weekly spot contracts for physical delivery, and regulatory services for shorter periods of time were operated by Statkraftverkene alone⁶⁰. However, the construction of a market institution from a theoretical ideal model represented a radical but only partial remaking of the sector and its actors – as the trading system only related to a marginal share of the entire trading system.

Soon the new computer technology was introduced to do the fairly complex calculations, and Samkjøringen gradually developed more efficient procedures which permitted for an extension of the market in terms of more frequent auctions and additional trading instruments. The new market quickly gained strong support from the members of Samkjøringen and its new director Rolf Wiedswang engaged in improving and expanding the new system. In figure 7.1. I have drawn up the simplified elements of the “Hveding-collective and its efforts at transforming the electricity sector:

Figure 7.1. Simplified elements in the Hveding collective





Pathway to realization/stabilization

Conceptual programs are represented by circles. Quadrangles indicate actants in the Hveding collective. Shaded quadrangles indicate elements/ systems (actants) constructed by the collective.

The Hveding collective became shaped by the joining of electricity system design as an engineer discipline with the EdF electricity economics, and its authority and major support came from this economic system design tradition, from Hveding's relations to leading World Bank managers and professionals and from the institutional powers of the NVE director general position. The program became influenced by early market-liberal economic influences and by a related critical view on the outcome of the state-hierarchical social democratic post war economic policy. Through the State Energy Council report and the mediations with representatives of the

hierarchical restructuring and the atomic energy programs within the council, the Hveding collective came to shape the principles of the coalition government electricity system policy.

7.2 *Hveding and the Norwegian electricity economists*

Hveding and his staff at the NVE brought their economic theories to economists at both the UiO and the NHH, but it was at NHH they received the more positive interest. The different orientation of the two academic research institutions came to represent an important duality among Norwegian electricity economists between one primarily macro-economic oriented approach at the UiO and a micro-economic industrial organization approach at the NHH. These came to play different roles in relation to Hveding's electricity economic program.

7.2.1 Hveding and the macro-oriented economists at the University of Oslo

At the UiO, professor Leif Johansen and younger colleagues like Finn Førsund and Steinar Strøm along with SSB⁶¹ researcher Torstein Bye, approached the electricity sector from the welfare theory. They focussed their attention on the optimal price and investment theory from a macro-economic resource allocation perspective rather than from Hveding's system design perspective. Through the close association of the UiO with the ministry of finance, they quickly engaged in sector politics. Much of their efforts concentrated on a critique of the low priced state contracts to the energy intensive industries and on a concern with the enormous economic resources which year by year went into electricity sector investments. Where these investments appropriate? Did they gain sufficient economic returns? Where they on time, or did the nation invest too much too early? Why should ordinary industries, consumers and tax payers subsidize large scale power intensive industries – both through inadequate price differences and through too large or too early public sector investments?

Gradually, marginal cost principles worked their way into the sector and finally reached a political breakthrough in parliament around 1980 – after ten years of disputes. The interpretation of these principles however, became subject for substantial controversy.

⁶¹ Statistisk Sentralbyrå

In this debate, there were broadly speaking four different positions; The Hveding-school and the welfare economists who represented two different scientific positions, the social democratic social engineering collective with their power intensive industries and the local cooperatives who represented traditional arguments and established practices which were the targets of the two others.

Hveding's position in the controversy was that production capacity should be expanded to meet the growing demand only to the extent that consumers were prepared to pay the cost of such expansion – a viewpoint shared by the economists. However, he argued that a price equal to long run marginal cost (LRMC) of expanding the system would be the right price “signal” to send to consumers. LRMC for the production system as a whole would be only roughly equal to the marginal cost of different individual new units added to the system, as units with different characteristics, like hydro or thermal, would contribute differently to overall capacity. This demanded a system design approach where prices should be set so as to reflect the relevant and rational system investment needs. Because of the long planning horizon, not only on the producer's side but also on the consumers', demand could be expected to come in line with LRMC only if prices were consistently determined on the basis of system expansion costs a few years ahead, and then periodically adjusted to the LRMC of further system expansion. Utilization of power available in the short term market on the other hand, played a relatively minor role and should be encouraged as representing resources which should not go to waste.

With the system containing so much capacity from the past, built at much lower nominal cost, the LRMC pricing principle would generate considerable cash surplus in the system. This would be useful for equity financing of further expansion but, in case of the surplus being transferred back to consumers/owners, this redistribution should be made on a basis independent from actual consumption.

Easy to recognize, this is the approach of an integrated system design and marginal cost economic program á la Oskar Lange with very high governance aspirations, which aimed at balancing the system at the point where marginal consumer willingness to pay, short run marginal costs and long run marginal costs coincide – through appropriate planning and imitation of market pricing. Pricing principles was not only about cost recovery, but also system development and economic solidity. They reserved the central decision-making role to the system designer – not the individual investors. Accordingly, the intended role of the occasional power market

was not to provide price signals to investors, but to improve the economic efficiency of the system as a whole⁶².

A different position was represented by the economists. In their view, and in line with a fundamental principle in main stream economics, the LRMC principle was an investment principle only, not a pricing principle. Investments should be done only when LRMC is lower than the expected SRMC in the future. Prices should not be set to secure cost recovery for new investments. They should be set so as to reflect the actual relationship between generating capacity and demand. Investments should only be done in response to actually increased demand – at the right point of time in appropriate amounts. They also argued in line with economic theory, that there should only be one price; a SRMC based price for industry, households and other consumers corrected for differences in costs of delivery. This would secure that hydropower resources be developed more efficiently and allocated to where it was the most needed – as measured by the consumers' willingness to pay. A price equal to LRMC would invite investments even though power might be available at a lower SRMC. The added capacity would then spill over into the occasional power market prices from where power intensive industries could purchase the capacity at even lower prices.

The economists' approach accordingly left a much more limited role to system designers, as managers of what they may have seen as "economic system externalities" which were exactly treated as less important externalities that "only had to do with the choice of technology" in any given case. Even though they argued for the SRMC as the pricing principle, they did not argue for a competitive market system. Their arguments seem to have remained at a highly abstract "in principle" level with no intent to construct an operational system based on the argument – or even to explain how a practical system might function. No doubt however, they thought of this in terms of efficient, professionally guided state governance and control rather than a decentralized market system.

The third position was represented by the social democratic social engineering collective and the power intensive industries. They argued that prices to international competitive industries should be globally competitive, where as other consumers should pay the higher domestic price. This would still be economic in a national perspective because of the value added by industries which would otherwise leave the country. In order to secure internationally competitive electricity prices and possibly to expand these

⁶² Interview with and comments from Vidkunn Hveding, 25.0398

industries in Norway, electricity generating capacity had to be expanded and export banned. These points of view did not seem to have any substantial backing from scientists, but had many other powerful combatants and representatives.

Finally, the fourth position was represented by the cooperatives, which argued for their traditional pricing principles based on historical cost calculations and “average cost” principles. These arguments rested on the cooperative conceptual framing that the electricity sector represented a not-for profit economic activity where the economic objective was to keep prices as low as possible to consumers (or to balance consumer surplus and company profits). However, to secure sufficient cost recovery to the electricity companies from their investments, prices had to be protected against the influences of the fluctuating occasional power market. Hence, the approach was a combination of subsidizing new investments with cash surpluses gained from historical investments so as to serve local consumer interests, and securing a minimum cost recovery and build up of internal funds for further investments. These pricing and investments principles are typically found in cooperative enterprises like requisite associations. Even though there is an international literature on cooperative pricing and investment principles, none of it appears to have become mobilized by advocates for the cooperative view.

Hveding and his staff in NVE worked hard to convince the government and the politicians in parliament that prices should be based on the LRMC principle rather than “average costs”, and in particular that the Statkraft price – which served as a yardstick price also to other suppliers – should be increased accordingly. When the economists interfered by arguing that Hveding’s principle was incorrect and that the short term marginal cost principle should be applied as the pricing principle, without specifying how this could be practically implemented, this forced the political discussion into unmanageable complexity. Given that prices were to be set by parliament - and that large stochastic influences on prices in the occasional power market with limited consumer participation made calculations of correct short term marginal costs highly uncertain, it was not easy for politicians to apply the principle advocated by the economists.

The outcome of the process was a long lasting and confused debate which only moderately influenced practical pricing principles and price levels, and which left harsh controversies between Hveding and the UiO economists. The economists claimed that Hveding was confused about the difference between the investment and the pricing criteria, and Hveding responded that the confusion was really on the economists’ side, as they failed to realize that there was no functional market for power at large to give price signals

with which to match the marginal cost of supply expansion. By disavowing the LRMC pricing principle, the achievement was only to turn pricing back to the traditional historical cost pricing – which in hindsight was largely what happened.

The Hveding collective did not manage to generate a convincing breakthrough for its modified EdF economic program. The lack of both political and professional support to its fundamental economic planning principles obviously contributed to the frustrations which caused Hveding to retire from the NVE in 1975.

The parliament in 1980 finally “obeyed” to the LRMC pricing principle, also for energy intensive industries. But state power prices remained politically negotiated in parliament. In order to settle with the energy intensive industries on prices, which had now been “talked” a bit up by the state administration and the economists, discounts now took place through adjustments in the calculated rate of return on investments implicit in the LRMC principle, to fit with the negotiated price level. Hence, “professional control” of pricing remained largely inaccessible.

The energy intensive industry on the other hand, had to accept somewhat increased electricity prices in the new 1976 contracts and in particular in 1983 contracts, which occurred in a period with increasing over-capacity in electricity generation with low prices in the short term internal power exchange market. The result was that almost no 1983 contracts were settled, that the industry increased their purchases in the short term internal market and that also the industry felt it was into a losing game in parliament. Gradually, some of its core representatives - like Norsk Hydro’s director and later Minister of Petroleum and Energy; Eivind Reiten - argued for a more market based price-setting of new electricity contracts, without political interventions (Reiten, 1988:125-132). This shift in orientation permitted for a later important association between the power intensive industries and the market reform collective.

7.2.2 Hveding and the NHH economists

At the NHH, Hveding met an environment which was much more oriented towards the actual functioning of the electricity industry at a structural, operational and micro-economic level of analysis – to which Hveding felt a closer kinship⁶³ (Thue, 1996:98). The one to take the most interest in his theories was a young economist named Einar Hope, who worked with

⁶³ Hveding had been a guest lecturer at the NHH when he returned from Kuwait in 1965.

professor Gerhard Stolz in the area of Industrial Organization Theory. On Hope's initiative, Hveding and his staff at the NVE on several occasions came to present their theories at seminars with NHH economists and students.

With the establishing of the Center for Applied Research (SAF) headed by Einar Hope at the Institute for Economics at NHH in 1972, the industrial organization research program had created an institution to carry out a large empirical research program which covered a variety of industries. The primary purpose of the program was to produce educational literature for the students. One of the sectors which quickly moved to the focus, was the electricity sector.

In the wake of the oil-crisis in 1973, Hope obtained a research project from the private electricity company Hafslund AS to study the effects on the electricity market from increased oil prices. The project ended with the report "Economic effects from increased energy prices"⁶⁴. Later, Hope's attention turned towards investigating the functioning of the occasional power market. Through a close cooperation with Samkjøringen and its managing director Rolf Wiedswang, Hope gained access to large volumes of data from the power exchange system, and gradually established himself as a leading economic expert on the electricity trading system - with substantial legitimacy within the engineer dominated sector.

To Hope, the occasional market represented a tremendously interesting empirical phenomenon because it represented an ideal competitive market for a very homogenous commodity. Despite the absence of free access to the market, the system represented a unique market system where theoretical propositions could be investigated. Soon, however, upon discovering the very simple arrangements involved, he became engaged in improving the institutional trading system, the contracts, etc. and to expand the competitive market into new functions and new types of contracts. One of the ideas which he presented already in the late 1970's, was to establish a futures market for standardized financial electricity contracts in order for generators and distributors to manage their contractual risks. The idea did not catch on at the time – probably because it sounded too complicated or too "unfamiliar" to the practitioners at the time. In 1984 Samkjøringen established a trading system for such contracts which however did not become a noteworthy success at the time.

⁶⁴ Hope, E. and K. Lotsberg (1974): "Økonomiske virkninger av økte energipriser", Bergen, SAF. My translation

According to the EdF theory, short term trade due for instance to stochastic influences, should be priced according to the SRMC principle. The occasional power market served a specific role within the hierarchically planned system; to absorb disturbances and to reduce the need for dams in the hydro-power system. With optimal investments, prices should be expected to fluctuate on both sides of the LRMC depending on meteorological conditions. The role of the occasional power market was a very specific one in the system design approach pushed by the Hveding collective, where as Hope in cooperation with his colleagues in Bergen gradually developed a different and much more fundamental role for the market institution.

During the late 1970s and early 1980s the occasional power market price deviated substantially over longer periods of time below long term marginal cost. This followed partly because of the high security of supply standards according to which Norway should be self-supplied 39 out of 40 years on average, partly because of over-optimistic demand forecasts and pressures from within the sector as well as from energy intensive industries to construct new power plants (Midttun, 1987), partly because of the policy to constrain energy exports, because of the large capacity increases in Sweden caused by the establishing of new large atomic power plants in the early 1980s and finally, because of a staggering international economy in which the expansion of large scale energy intensive industries became impossible. All of this resulted in a substantial over-capacity in electricity generation with successive price differences between the politically governed long term power contracts and prices in the occasional power market.

It was from the study of the risk problems and the strategic conflicts these problems caused to market actors as well as to society that a more extended electricity market research program emerged at the SAF.

7.3 The hierarchical restructuring program, atomic power and the roots of the new energy law

Two additional programs were included in the 1970 energy report from the coalition government in addition to those represented by the Hveding collective. These were the atomic power program and a program for organizational restructuring of the sector, which had been initiated by the AP government in 1960. After Hveding left office, Sigmund Larsen got appointed as director general by the AP government. Under his leadership, the sector restructuring approach was moved to the center as the major element in NVE's strategy to improve the economic efficiency within the sector.

The hierarchical restructuring approach may be seen as having roots back into the ambitions of the 1922 national plan, but its more immediate

influential sources are to be found in the idea about organizational economies of scale, in the model of the nationalized French electricity industry; the organizational structure of EdF, in the model of large American utilities, in the more successful restructuring of the sector in Sweden at the time, and in the more general ambitions of engineers towards gaining higher levels of control with behaviors associated with their technical systems.

7.3.1 The hierarchical restructuring collective

There was of course many small entities within the Norwegian electricity sector. In 1938 the number of distribution companies was 478⁶⁵. By 1973, it had been reduced to 337, of which 100 supplied less than 1000 customers, and additionally 157 companies supplying between 1000 and 5000 customers. Together, these 257 companies (76%) served around 24% of the customers. In the other end, the two largest distributors supplied 21%. The intermediate 78 companies accounted for the remaining 55%. By 1990, right before the implementation of the new market system, the number of distribution companies had decreased to 198, and several other mergers like in Østfold County and in the Sunnmøre region, were planned and carried out in 1991/92. In 17 years the number had decreased by 41%. Many of these followed from administrative mergers of municipalities, but through out the 1980's the hierarchical restructuring collective managed to mobilize for vertical integration within various regions of the country.

The cooperative system in many ways represented a much larger degree of integration than what appeared to follow from the large number of companies. Many cooperated on the basis of federative organizational principles within larger geographical areas without giving up the formally independent status of their own organizations. Midttun, Joa and Garsjø (1994) demonstrate how the country had become structured into 16 networks of electricity companies integrated in different ways; through political ownership systems, long term contracts, cross ownership, a mix of these or through complete vertical and horizontal integration. Of total consumption in 1991, close to 50% of the volume was supplied in completely vertically integrated systems. Across these structures there was also larger regional cooperative organizations – usually organized to negotiate contracts between regions with energy surplus and those with a deficit, and national organizations like Samkjøringen and NEVF served as operational and policy making hierarchical centers respectively for the entire cooperative system. One could say that the sector was actually highly structured and tied together

⁶⁵ Numbers are taken from Hildrum, 199:118 and from Barth Jacobsen, 1998

by a multiplicity of relations. And on top of it, there was a strong state-cooperative regulatory system framed by the concession law system.

The hierarchical restructuring program was constituted as government policy with the presentation of a parliamentary report in 1960 about the organization and competence of the NVE⁶⁶. A special unit within the NVE – “The Energy Directorate” – got established to be responsible for planning, rationalization and coordination of energy resources. The AP government thereby engaged in an ambitious project to restructure the many small organizational entities and to create a new unified structure. But, which one? Should it be based on the traditional historical cooperative systems and Samkjøringen, or should it be more of a state political hierarchy based on regional political institutions: the 19 counties and the NVE/Statkraftverkene?

To do the job in the E-directorate, were appointed Gunnar Vatten who became its director in 1962, and Asbjørn Vinjar. The young engineer Erling Diesen was also employed and served almost as a personal secretary to Vatten. Gunnar Vatten had been educated as an engineer in Copenhagen and worked in the NVE until 1956 when he went to work at Westinghouse in the US. He also worked at Oklahoma Gas and Electricity Company before he was called back to serve in the new directorate because of his knowledge about how to operate large utility companies. Asbjørn Vinjar had been to EdF as a trainee from 1951 and brought with him knowledge about the centrally planned and nationally coordinated electricity system in France. To Vinjar, the EdF model came to serve as an ideal model for the organization of an efficient and professionally governed electricity system (Barth Jacobsen, 1998:80).

These two men obviously reflected the two major sources of organizational inspiration and professional authority at the time; the American large scale utilities and the French EdF. They worked together on the restructuring issue until 1978, when Vatten got appointed head of Department in the newly established Ministry of Petroleum and Energy, from where he advanced the program further. Erling Diesen followed him to the ministry to work with a new energy report to parliament, where as Vinjar took over as the director of the E-directorate in NVE.

The model of the future electricity system constructed by Vatten and Vinjar in the early 1960's was based primarily on the EdF organizational model,

⁶⁶ St.prop. nr. 100, 1959/60: Om Norges Vassdrags- og Elektrisitetsvesens organisasjon og kompetanse.

and was denoted “Norgesdrift”. The model and the plan to implement it soon got strong support from the other NVE-directorate; Statkraftverkene and its director Sigurd Aalefjær. The basic idea was to establish one national cooperative organization for all public electricity generators and distributors to take over from Samkjøringen or as an expansion of it. In the new organization, state control and coordination was thought of in similar terms as within the EdF system; a centralized hierarchical system based on professional technological and economic expertise.

Regional entities were primarily thought of as based on county borders. To Vinjar, this came to mean the counties as institutions in between the state and the municipalities. Others, like Hveding - and to some extent also Vatten - hold a more pragmatic view which recognized that it would be practically impossible to force the inter-municipal cooperatives to transfer their property rights to the counties against their own will. However, Vinjar’s county based organizational structure model was the one which became presented to parliament in 1974⁶⁷. The majority in parliament opposed to the idea and rejected it from serious political treatment⁶⁸.

There seems to have been only a reluctant support also from the government for the very ambitious hierarchical program in the 1970’s – which might partially reflect the much weaker political basis for the various minority AP governments in between 1971 and 1981. The project was obviously pushed from within the E-directorate and from Statkraftverkene. Two elements contributed substantially to their hierarchical restructuring project. One was the way Nordic electricity trade got organized, and the other was the ambitious program for atomic energy which was pushed from collectives associated with the Auratom project and the Norwegian research institution affiliated with it: The Institute for Atomic Energy (IFA) (Andersen, 1987).

Nordic electricity trade had been a subject for some controversy. Electricity trade with Sweden and, from 1976, also with Denmark, became organized mainly in accordance with the hierarchical program. It provided an important arena for state coordination and a market monopoly for Statkraftverkene towards other Norwegian generators. In the 1950s, a regional power company – “Sør-Trøndelag Kraftlag” had established an export contract to sell electricity to Stockholm. This led to an intervention by NVE director general Fredrik Vogt which in practical terms turned foreign electricity trade

⁶⁷ St.meld. nr. 100, 1973-74

⁶⁸ Innst. Stortinget, nr. 255, 1974-75

into a state monopoly in order to maintain national control with electricity export. A system of state monopoly trade accordingly was established in which the foreign market became a system for short term power exchange rather than long term contracting – based on a principle of national supply responsibility. With the cables to Denmark, the Danish (and the Swedish) thermal power plants in the Norwegian perspective became the “swing producers” needed to manage the large stochastic influences within the Norwegian hydro-power system.

Because transmission capacities were constrained, the international market did not clear supply and demand at Norwegian occasional power market price. To solve this problem, prices were set at the middle point in between the Norwegian occasional power market price and the calculated marginal cost of the marginally producing plants in Sweden and Denmark. This provided opportunities for the state monopoly to gain an additional profit, and Statkraftverkene argued that this profit should be kept by the state company as a compensation for its investments into transmission capacity to foreign markets. The parliament however, supported the other generators, and forced NVE/Statkraftverkene to distribute profits from foreign trade among all the generators. The controversies and strategic behaviors which followed, later became an important point of critique from Einar Hope.

The atomic energy project contained more arguments to support the hierarchical program. The project was an important point in the 1970 energy report from the coalition government, and had been forcefully pushed by an entrepreneurial collective associated with the IFA since the mid-1950s. Among them were leading personalities among the AP post-war industrialists; Jens Chr. Hauge, Finn Lied and professor in physics Gunnar Randers. Hveding and the NVE were not particularly interested in the controversial technology, but were more or less forced into it from two different directions. One was from the breakthrough of the atomic power project in the government’s energy report and the other was from the new emphasis on area planning which had recently been introduced to counties and municipalities. The NVE accordingly engaged in investigating possible locations in case parliament should decide to establish a large scale atomic power plant. However, these investigations and its report opened the stage for protests from environmentalists and communities who angrily attacked the NVE and refused to have an atomic power plant in their neighborhood. The NVE area planning project thereby opened up for a rapid political breakdown for the atomic power program. The discovery of large oil and gas resources in the North Sea which provided less controversial alternatives, added to the reluctant reception of the atomic power program in parliament. Despite the efforts of technological experts to convince the public about its

tight safety standards, the atomic power program in Norway dropped dead and finally got abandoned also by the AP at the end of the 1970s.

The 1970 energy report had suggested that decisions on the construction of an atomic power station could be taken by parliament as early as in 1973. The majority in parliament however, pointed at the need to establish an adequate legislation to regulate such a new technology before further decisions could be made⁶⁹. This initiated work on a new energy legislation which was first to culminate with the new market oriented energy law in 1990. By 1974, it had become clear that the parliament would not support the atomic energy project, and the plans were pushed aside. From now on, thermal power ambitions came to be concentrated on establishing links to foreign thermal power generators and on exploring the natural gas alternative.

7.3.2 The OED and the 1980 energy report

In 1978 the AP government established the Ministry of Petroleum and Energy (OED) by separating the Ministry of Industry into two parts. The main argument had been the increased administrative pressures from the rapidly growing new oil- and gas sector. Bjartmar Gjerde was appointed the first minister of the new ministry. Within the energy department, Gunnar Vatten established a new and “flexible” organization to cope with both oil-, gas- and electricity market issues, where as the waterfall department became headed by the jurist Hans-Ludvig Dehli concerned with new power plant constructions and the judiciary. Erling Diesen was invited by Vatten to do the job on working out a new energy report to parliament which became an ambitious and programmatic product from the new ministry regarding the electricity sector.

At this point of time, the state organization of the oil sector emerged as a model for the electricity sector – cornered on a strong role for a semi-autonomous state owned joint stock company model: that of Statoil. The 1980 energy report from Diesen turned out to represent a renewed ambitious hierarchical program which pointed out the need to rationalize the many small entities by restructuring the sector into one large state company; Statkraftverkene, and around 20 vertically integrated regional power companies – preferably organized by the counties⁷⁰.

⁶⁹ Innst. Stortinget, nr. 222, 1970-71

⁷⁰ St.meld. nr. 54, 1979-80

A new political-administrative organization of the counties in 1976⁷¹ with their state delegated new roles and strong support from the AP, provided for a renewed effort to transform the traditional local cooperatives within the electricity sector into a hierarchical state-county-municipality structure in line with the vision advocated by Vinjar. But as it turned out, an essential problem to the approach was that the new county organizations neither hold property rights within nor had any expertise on the electricity sector. Early attempts at giving the counties a direct role in the sector by allocating state property rights to counties, had been strongly opposed to by the established inter-municipal federative organizations. The conflicts between the established cooperative systems and the counties were intense at the time and led to different outcomes for the county initiatives. Some places – like in the AP stronghold Hedmark, they managed to establish a large rival to the established cooperatives, where as for instance in Rogaland and Hordaland, county property rights became forced into the established cooperative systems Lyse Kraft and BKK.

Given these circumstances, the continuous advocacy for a strong role for the counties by leading NVE and OED officials, appears to have rested largely on strong ideological beliefs rather than political strategy, which sealed off opportunities for modifications to stabilized locked-in powers within the sector. It appears that a strategy for restructuring based on the existing large regional cooperative companies, probably would have been more successful in creating a political breakthrough for organizational integration.

The new energy report received a very mixed response in parliament. In particular the formulations regarding centralization and the role of the counties were opposed to by the opposition – pushed by local and cooperative political influences. Høyre, who had earlier been a supporter of hierarchical restructuring, now argued that the proposal would undermine the position of local power companies and pointed at the need for local adjustments, initiative and flexibility within the industry and the need to maintain a number of entities within the sector so that one through comparative analysis of costs associated with different ways of doing things, could find the more rational methods. The party argued that inter-municipal companies of a sufficient size were sustainable economic, technical and managerial units and provided for political governance opportunities at local levels⁷². Also the SP, the KrF and the FrP representatives in the industry and

⁷¹ Fylkeskommunene

⁷² Innst. Stortinget, nr. 348, 1979-80.

energy committee argued against centralization and the proposed role of the counties. Given these positions, there was no majority for the governments propositions and no obvious platform for political consensus-making.

What added momentum to the political opposition, was the protests from the local cooperatives. Their representative industrial organization NEVF worked out their own report, which argued that a realistic ambition would be to reduce the number of electricity companies to around 150-160 by the year 2000. Also the influential board of the NVE argued against the ambitious plan to create 20 vertically integrated regional companies (Barth Jacobsen, 1998:90). The argument was that there was no political support within the sector, and in particular that county participation had not been received with enthusiasm. Those involved with the local electricity companies were not fond of the idea that their sense of local control with investments, employment, returns to other non-electricity sector activities and electricity prices should get out of their hands and be transferred to a county organization – presumably in part directed by a state who struggled for centralization of governance and control within the entire electricity sector. No doubt, the idea about a strong role for the counties directly confronted the established power system within the general supply system in control of property rights, financial resources and technical expertise as well as sector organizations to lobby for their interests. The NVE appeared to be divided, and the hearing process demonstrated a fairly massive response against the 20 vertically integrated company plan.

7.3.3 The Energy Law Commission and its consensus on “voluntary hierarchical reform”

Following the response from parliament to its energy report, the AP-government established a broad representative commission with a mandate to propose suggestions for a new legislation; the Energy Law Commission. It was constituted in January 1981 under the new AP-minister in the OED; Arvid Johanson, who served only a short period until the Høyre-government took over in the autumn and appointed Vidkunn Hveding to the position, who however had to use most of his time in pressing issues within the petroleum sector at the time.

The Commission was headed by Fylkesmann Arne Haukvik, and contained representatives from various ministries, the NVE, the municipalities (KS), the electricity industry (NEVF) and the electricity intensive industry (LEEI). There was also two appointed experts, the lawyer Eilert Stang Lund and the economist, Assistant Professor Vidar Christiansen. Per Håkon Høisveen in

the OED served as the secretary for the commission, and from 1982 he was joined by his colleague Jon D. Engebretsen⁷³.

The difficult part of the issues addressed by the commission, was the idea about a national cooperative/state governed system for the entire electricity system called “Norgesdrift”. The discussion aimed at finding operational solutions to create an integrated hierarchical governance system for the entire electricity system and to define the future institutional-organizational structures of the sector. This part of the work was headed by Erling Diesen. By pulling together the various stakeholders in the electricity system in specially established sub-groups, the commission served as a forum for negotiations between the various actor-networks; the local cooperative, the energy intensive industry and the state hierarchical restructuring - a process which moderated the attempts at giving the state very substantial legislative powers to restructure the sector into a EdF type of hierarchy with a professionally guided order. In the end, the commission, in order to achieve consensus, had to accept that structural reforms basically should have a voluntary character (Thue, 1996:93) – an outcome similar in principal to the outcome of the 1922 national plan initiative. In practical terms however, the state in the 1980’s had achieved a substantially more powerful ability to direct and control local electricity companies through a variety of governance institutional and financial instruments created since the 1920s.

Despite the compromise, the majority in the commission included a variety of suggestions for legislative changes which formally would provide the state with improved powers to force through a hierarchical reform. This dual outcome clearly illustrated the continuous rivalry and controversy between the local cooperative and the state hierarchical actor-networks within the sector and pointed at still substantial uncertainty about the ability of the local cooperatives to either block or substantially modify the implementation of a possible hierarchical reform through the legislative process.

The Commission delivered its main report; “Energilovgivningen” in March 1985, which also contained proposals for a new legislation. The report argued for structural reforms through horizontal and in particular vertical integration between electricity generators and distributors into larger regional entities which *over time* preferably should develop into a national system with one national and approximately 20 regional vertically integrated electricity companies. As operational tools to force such a development, the commission suggested a mix of new licenses (concessions) and state

⁷³ NOU 1985:9 “Energilovgivningen”

expropriations, economic incentives and a variety of administrative procedures which to a larger degree would favor vertically integrated companies.

The economists within the commission, represented by Kjell Mathisen (FD) and Vidar Christiansen, did not oppose to this hierarchical reform approach. Their main contribution was the insistence on marginal cost principles for pricing and investments. In the report, it is hard to find any influences at all from the wave of market reorientation at the time.

The continued controversies with the politically influential local cooperatives – and to a growing extent with the emerging wave of market oriented actors - led to a halt in the hierarchical reform process. Under the H-SP-KrF government (1983-86), Gunnar Vatten and his colleagues within the OED saw no reason to push further and put the report aside. The hierarchical reform initiative had apparently reached a dead end at the political level – where as it maintained the upper hand within the sector and continued to push for regional integration across the country.

7.4 In search for efficiency: Defeats, deadlocks and dead ends

All of these programs and their associated collectives of actors were dedicated towards improving the economic efficiency of the electricity system. Their framing and core concepts however, were very different, and their associated world models had different implications for established collectives within the sector. What can be said in general is that none of them really had succeeded in mobilizing sufficient arguments and support to overturn objections from their opponents and to generate a convincing political and institutional breakthrough which would have permitted them to substantially reshape the industry.

The system design and EdF economic program represented by the Hveding collective, managed to establish important elements of their program within the sector, such as the occasional power market, the EFI simulation model and the Nordic power exchange system, but was unable to establish its pricing and investment principles in any conclusive manner. This was at least in part due to lack of support from the economic profession, which undermined Hveding's LRMC pricing argument.

The UiO economists on their side, did not develop any operational alternative to support their in principle arguments and remained within a highly abstract level of argument which aimed at constraining hydropower

investments at the time and to level out prices between different categories of consumers. These efforts succeeded to a fairly limited extent.

The ambitious atomic power program on its side, had to face a devastating defeat. The only remaining alternative for a substantial reform which could improve the economic rationality and overall efficiency of the electricity system, was the hierarchical restructuring program represented first and foremost by Vinjar, Vatten, Diesen, the E-directorate and Statkraftverkene. This program managed to create both significant representations of its program and to initiate and structure political processes so as to mobilize for its becoming reality. However, both conceptual weaknesses represented by the strong role given to the counties and external events outside any control of the hierarchical restructuring collective, forced the program to a slowdown and eventually to silence. These external events were primarily associated with the market economic re-orientation – which had dramatically shifted the political outlook for state-hierarchical reform projects.

Taken together, this left the sector in rivalry between a number of relatively weakly represented alternative programs for the reshaping of the industry. The sector apparently found itself into a dead end in terms of moving the industry forward towards the final goal of optimal technical and economic efficiency – or even a decent level by comparison to other countries at the time. The row of apparent failures to create a substantial political breakthrough for any of the programs which engaged to improve the efficiency of the electricity sector in the 1970s and early 1980s, left the stage open to a different approach – if it were able to come up with a powerful re-framing of the sector, if it were able to mobilize sufficient arguments and professional and political support, and if it could avoid provoking strong counter attacks from well established historical collectives like the local cooperatives and the large scale power intensive industries. But where could such a different framing come from – and from where could it gain the necessary strengths?

8 Return to markets: Re-orienting economics and reshaping economies

We shall now leave the Norwegian electricity sector for a while in order to obtain a description of the situation from a different perspective. We shall trace - in a fairly brief sense – the radical shift in economic orientation from the state-hierarchical approach associated for instance with Oskar Lange, Ragnar Frisch, Jan Tinbergen and their students, to the market approach associated with its advocates such as Friedrich Hayek, Milton Friedman and George Stigler - and with “Thatcherism” and “Reaganism”. From there we shall follow the neo-liberal market program back to Norway. The ambition is to investigate major pathways of networking activities and early economic reforms in order to figure out how these events related to the electricity market collective.

The initial shift in Norwegian economic policy orientation largely took place in between 1977 and 1984 in the area of macro economic governance and credit market policy where Friedman’s monetaristic approach challenged the “real economics” governance systems which had been established from the ideas of Frisch and Lange. Soon, however, the neo-liberal market program confronted the established order within multiple areas of economic policymaking.

The breakthrough for the market program within the area of credit policy came to represent a gradual transformation of the Norwegian economics profession and a relative shift in influence between economic research institutions. It was followed by a fairly radical shift in political and economic attitudes within the population in general, articulated by rapidly growing right wing political parties. This broad shift towards a market re-orientation also induced a rapid expansion in the education of economists – in particular at the public and private business schools. These became the new generation of human representations of the expanding program, with a capacity to link its theories to real life practices in business as well as within the public sector. Some of them quickly came to power in large industrial and financial companies in the 1980s – and others entered the rapidly growing industry of economic advisers; those John Meyer denoted “The Institutional Others” (Meyer, 1996) who engaged in translating the new frameworks and theoretical concepts and in re-configuring organizations and shaping new economic practices.

I will argue that the massive change process resulted from a combination of the expansion of the neo-liberal market program within economics which promised to provide more appropriate governance models as well as to open

up for a more dynamic, competitive and efficient economy, with the failure of the stabilized post-war collectives to maintain its stability and legitimacy through the real-life test of a severe international economic recession. In Norway the result was an economic governance crisis around 1977-80, which undermined the legitimacy and the authority of the established post-war governance models, their theoretical core, their governance technologies and their research institutions, organizations, professionals and politicians. This opened up the field to available alternatives which could present sufficient authority behind themselves.

In 1981, a “Høyre” government came to power and initiated a program for “new public management” within the public sector. Both the credit market reform and the new public management initiatives are found to be important preconditions for the later electricity market reform. To tie these events down to the electricity sector case, I will discuss in brief the new public management inspired restructuring of the NVE in 1985-86, which separated Statkraftverkene from the NVE and turned it into a profit oriented semi-autonomous state enterprise.

8.1 *The return to markets in economic theorizing*

In the late 1960's and early 1970's, what was to become known as neo-liberalism within economics emerged within the community of economists - in particular in the US. It was followed by a gradual political breakthrough in the US in between 1974 and 1980, and by a later but more rapid, radical and politically dominated breakthrough in the UK in 1979, which had been into severe economic problems during the 1970s. These developments spread rapidly but not as radically across Western Europe around 1978-81 (except France). It represented a radical return to the competitive market approach as represented by Ludwig von Mises, Friedrich von Hayek, Milton Friedman and others who had been pushed aside by Ragnar Frisch, Jan Tinbergen, Oskar Lange and those others who represented the hierarchical economic program since the 1930s and -40's.

In the broad economic picture at the time, the Soviet Union no longer appeared to be in a state of dynamic economic growth. It was rather in a state of industrial, economic and political stagnation with continuous problems delivering the promised consumer goods to its population. In Western Europe state owned industries experienced severe problems everywhere. Trade unions went on strike to protest against public sector cut backs. Public budgets had expanded rapidly and caused substantial tax increases which triggered new types of popular protests, and the international economy struggled with growing inflation and staggering markets. The powers of the

established hierarchical program virtually “collapsed” as both governance and efficiency problems became evident – and in particular as its innovative capacity came under questioning by a rising number of new advocates for the competitive market alternative. The stability and growth problems in the economy had obviously not been completely resolved through the combination of state hierarchical industrial initiatives and Keynesian economics - after all.

In the US, the University of Chicago where Milton Friedman was a professor, came to represent perhaps the most important “commanding height” for the new market oriented approach under the new slogan: “more markets – less state”. During the Ford and Carter administrations, there had been a gradual roll back of state regulations and market interventions based on a well articulated critique by another Chicago economists, George Stigler, in his theory of regulatory capture and costs of government control. State regulations was said to make economic activities too rigid, too cumbersome, too slow. Lack of efficient competition also was said to make it impossible to keep down inflation. State regulations were furthermore claimed to be inefficient as a strategy to support consumers, because firms through better knowledge about their own activities than the regulators, always would be able to circumvent regulations or turn regulations in their own favor. Critique towards the “American regulated capitalism” also emerged from other institutions such as the generally regarded politically moderate Brookings Institution and the emerging right wing and highly ideological Public Choice economists.

8.1.1 Early market reforms in the US

A political process towards a neo-liberal breakthrough can be said to have gained power in 1974 when senator Edward Kennedy as the chairman of a government committee on administrative practice and procedure, brought in Stephen Breyer, a Harvard Law School professor, to work on regulatory reforms. Together they initiated investigations into airline regulations and a number of other industries which became objects for deregulation in the years to come – starting with the airlines in 1978. The airline industry reform came to represent a powerful representation of the neo-liberal program by demonstrating how an entire industry could be successfully re-framed and re-configured on the basis of market economic theory.

A very influential event which stimulated these early reforms was the publication of Alfred Kahn’s book “The Economics of Regulation” in 1970, which presented the essential economic critique of traditional American economic regulation; that it prevented prices from doing its job in the markets, and thereby had devastating consequences for economic efficiency. The objective of regulation, according to Kahn, should be to ensure that

prices were set according to marginal cost principles. Equipped with these ideas, he also came to play an important role as the director of regulatory reforms in various industries. His first job was to govern a reform of the price system in the New York State electricity system, which introduced the EdF marginal cost theory to actual pricing practices in the US. This was however an “imitated market” approach, not a “real market” system. Later, he headed the implementation of the “real market” airline deregulation process as chairman of the government’s Civil Aeronautics Board (Yergin and Stanislaw, 1998:341-346).

8.1.2 The British crisis and neo-liberal revolution

A radical, ideological and political breakthrough in Europe occurred in the UK. In 1976, the country and its Labor Party government had partly been set under administration by the IMF, when the government had to borrow large sums to support the state budget and the pound. During the 1970’s, it gradually became clear to observers that Britain industrially and economically had lagged substantially behind continental Europe and appeared to be incapable of modernizing its industries in order to make them internationally competitive. One after one large companies became dependent on state subsidies and eventually had to close down. Very few new industries emerged successfully. The government could no longer afford to carry out a Keynesian counter-cyclical policy, inflation rose to 20% and unions were on strike in various sectors. The radical breakthrough for the neo-liberal program accordingly came in a country where the hierarchical program met the more severe crisis, its perhaps most dramatic breakdown before the fall of the Berlin wall in 1989.

Around 1974, when Friedrich Hayek received the Nobel prize together with Gunnar Myrdal⁷⁴, a radical right wing political opposition within the Tory party affiliated with Keith Joseph, Margaret Thatcher and a research institution named Institute of Economic Affairs (IEA), started educating themselves in the theories of von Mises, Hayek and Friedman, and to advocate their ideas all across the country as the radical solution to Britain’s economic problems (Yergin and Stanislaw, 1998:92-108). A rapid reform process was implemented when Margaret Thatcher became prime minister for a new conservative government in 1979.

The “bible” of the new regime was Hayek’s book from 1944: “The Road to Serfdom” which presented the essence of the liberal market critique of the role of the state in the economy, the hierarchical “imitated market” approach

⁷⁴ The Nobel committee chose Hayek to counter the leftist and local Swedish candidate.

of Oskar Lange, the mixed economy and collectivism in general, and which argued for the self-sustaining order and innovative capacity of a competitive market with profit oriented actors. Privatization, construction of new market institutions and tax cuts dominated the agenda and also came to include a radical electricity market reform in 1989, which at the time came to add further momentum to the Norwegian reform.

8.1.3 Market re-orientation in Europe – and the new public management program

In 1979, the CDU/CSU with Helmut Kohl as Bundes-chancellor, took over from the social democrats also in Germany. In the following elections during 1980-81, right wing governments came to power in the US with Ronald Reagan, in all the Nordic countries and all across western Europe apart from France, where Mitterand won the 1981 president election and pushed through a Keynesian and welfare state oriented economic program which was given up first by 1985. Many of the European social democratic governments had been forced into budget cutbacks and industrial restructuring through the 1970's. The changes however, never became as radical as in England.

As noted in chapter 3, the situation in Norway in several ways was different from other West-European countries. The UiO had since the 1930s been one of the international academic strongholds for the state-hierarchical program and had been an important policy producing institution. The country voted against membership in the European Community. Large oil reserves had been discovered in the North Sea which increased the credit rating and the debt capacity of the state, and the AP government became dependent on a strong left-wing opposition in parliament for its political support. The answer to economic recession and increased governance problems in this situation, was to apply more of the same; more of the traditional governance technology developed by the Oslo School economists and more expansionary budgets in line with traditional Keynesianism. When the crisis became apparent in 1977, the shift became relatively dramatic.

The breakthrough for neo-liberalism in economics fuelled a related program for public sector modernization; the so called new public management program, which took as its starting point that business companies due to their profit incentives were much more innovative and efficient than government bureaucracies, and that organizational forms developed by business firms could and should be applied to all kinds of public sector activities for the purpose of improving their efficiency. The program developed from economics into organizational theory and drew substantially upon the emerging area of business strategy theory which came out of leading

business schools. These ideas got adopted by international institutions like the OECD, the World Bank and the IMF, which pushed for public sector reforms across the world.

8.1.4 A few notes on important developments in economic theorizing

In the US, the continuous economic problems during the 1970's with staggering growth rates, inflation and high unemployment rates were met with a reorientation back to "the efficient order of the competitive market". In this respect, it was quite the opposite of the initial Norwegian response, which was to increase state hierarchical ambitions, interventions and controls within the corporate governance model.

The shift from the state regulatory to the competitive market program, fueled a broad range of economic research. New theoretical developments followed from a variety of theoretical approaches. A market selection theory presented by the Chicago economists in the 1950s became the explanatory foundation for a rapidly emerging area denoted Neo-Institutional Economics, which expanded the market theory to theories of the firm; Property Rights Theory, Agency Theory and Transaction Cost Theory - associated with scholars like H. Demsetz, E. Fama, M. C. Jensen, W. Meckling and O. E. Williamson in the 1960s and 1970s. In particular Williamson's Transaction Cost Theory came to influence economic thought and to provide a new focus on the structuring and functioning of firms in markets, the role of contracting, the possibilities for "outsourcing", restructuring etc. These ideas were rapidly picked up by the new area of business strategy theory and spread from there into business where it radically influenced business practices, organizational systems and industrial restructuring in the 1980s.

Another construct which became important was the Theory of Contestable Markets (Baumol, Panzar and Willig, 1982) which was based on the idea the even though markets or resources might be monopolized, the market itself could be seen as an object for competition or it could be subjected to "potential competition" through the lowering of barriers to entry for competing firms. This became the basic model for a state and public sector policy to organize auctions in which private companies competed for procurement monopolies and rights to explore national resources and policies where the state actively supported entrance for rivals in concentrated markets. The approach rapidly expanded to all kinds of public services where new market institutions (auctions) became organized to let private companies compete for the right to deliver specified public services.

Economics also expanded rapidly into political theorizing – not at least through the neo-utilitarian “Public Choice” program affiliated with J. M. Buchanan, R. D. Tollison and G. Tullock (1980), as well as into other social sciences. Without any intent to review these large areas of theorizing, I think it is fair to say that the 1970’s and -80’s represented a vigorous growth in economic theorizing and an expansion of economics into an even more influential position among the social sciences, which reflected highly optimistic views on what could be achieved to society from its contributions. The very optimistic thoughts on behalf of the ability of the market approach to solve even the most troublesome cases, provided the emerging market program with a tremendous capacity to associate with policymakers across the world and to transform societies and economic sectors through regulatory reforms, constructions of market institutions and advancements of theoretical concepts and models.

The strong support for deregulation, more markets and less state, should not be seen as a general support for less economic governance on behalf of society. On the contrary, the substantial developments within economic theorizing and the huge arsenal of new governance tools developed, make it highly implausible that less governance was the goal. Rather, the market reorientation reflected the acknowledgement of the limitations to economic governance efficiency from traditional hierarchical, regulatory and cooperative approaches, and aimed at developing much more efficient economic governance systems based on a radical “externalization” of non-efficiency objectives from the context of economic activities. Whatever choices which followed from not-for-profit objectives, became defined as “economically irrational”, and were handed over to the list of externalities to be dealt with outside markets – like environmental problems, distribution of wealth problems, migration problems etc. Through state taxes and subsidies however, these problems could be “re-internalized” in a second turn – without altering the narrowly defined rationality of economic actors needed to form atomized calculating economic actors engaged in economic interactions and activities.

The role of economists became to construct new market systems, guide the “externalization” and “re-internalization” processes and design the institutional and regulatory systems which would force economic actors to behave in ways compatible with the roles and the rationality assumptions prescribed by economic theory. To support this market constructing approach, to advice the new “fiercely competing firms” on how to succeed in the new markets and to advice politicians on which market model to go for and how to regulate atomized profit oriented actors, additional economic concepts and theories developed at a high speed.

Some of the most important theoretical advancements were achieved within micro-economics – in particular through the application of mathematical game theory to economic modeling. For decades, economists had been criticized by institutionalists and organizational theorists for their lack of institutional and behavioral realism and thereby lack of proper insights into the micro order of real world economic activities. This was in essence a critique of the radical externalization of institutions done by economists in order to establish conditions for calculating the optimal choices of economic actors in mathematical terms. With the new modeling concepts presented by von Neumann and Morgenstern in their book: “Theory of Games” (1944), and the flow of mathematical modeling which followed in the 1950s and -60s, modeling assumptions could be claimed to be more realistic, despite a continued radical externalization of non-efficiency or not-for-profit objectives. More complicated micro-economic decision situations could be addressed by mathematical models, which included specific industrial structures and which addressed more specific areas of economic decision making. These contributions radically improved both the credibility of and the operational applicability of the economic theory to economic regulators. Today, the micro-economic game-theoretical research program is still rather progressive - moving for instance into the area of Simon’s “bounded rationality” concept in order to “close the gap” to empirically founded insights into human decision-making.

Another area within economics – one with a less formal, but more empirical orientation - had been engaged with micro-economic industrial and institutional studies for quite some time. This was the Industrial Organization tradition – or the “Structure, Conduct, Performance” tradition as it was also labeled. This research program combined the standard competitive market theory with empirical studies of the micro-structures, incentive systems and efficiency outcomes found in different industries. With the inclusion of non-cooperative game theoretical modeling based on the “Nash equilibrium” concept in the early 1950’s, and the theory of second best solutions from theory of taxation in the late 1960’s, the IO-theory area developed into a mainstream field of economic research also for mathematically oriented economists. Similarly, in the area of procurement and regulation theory, game theory applied to principal agent theory and the concept of asymmetric information developed within insurance theory, revolutionized micro-economic theorizing.

Equipped with this new generation of modeling tools and a radically increased capability to model detailed and complicated relationships between strategic situations, and cost-, incentives- and information structures, the micro-economic research program expanded rapidly throughout the international economic research community. From its initial American

dominance, French economists like Jean-Jacques Laffont and Jean Tirole, came to influence the area through their “elegant” mathematical contributions. The radically increased capability to model micro-economic incentives and strategic economic problems by the use of game-theory, had vast implications for the persuasiveness of the economic program we associate with neo-liberalism, and thereby its ability to produce policy recommendations and to initiate and direct institutional reforms through out the world.

As a consequence of these developments, numerous economic sectors of the American economy and gradually also many in a number of other countries (like Great Britain), became objects for deregulation initiatives, like for instance the road transportation industry, the railway-, the harbor, the oil- and gas-, the airline-, the telecommunication- and the agriculture industries, and the public utilities like water- and energy distribution. Within the neo-liberal framework, the various new theories were specifically applied to the institutional-organizational-technological characteristics of each particular sector. New markets were constructed, new roles and rules of the game were defined, new governance systems were established and new industrial structures prescribed.

8.1.5 The electricity sector deregulation program in the US

The electricity sector was one of the latest to be addressed by the wave of deregulatory reforms in the US. What happened in the 1970's, was primarily an introduction of the French marginal cost theory to pricing practices as for instance done by Alfred Kahn in New York State, and a development of regional power pools in which generators could trade electricity on a bilateral basis. The period until 1977 also represented a rapid expansion of atomic power plants. A new legislation under the Carter administration in 1978 focussed on energy saving in the wake of the crisis for the atomic power industry, but also opened up for the so called independent power producers (IPPs) to supply electricity into electricity networks owned and operated by traditional regional monopolies a “contestable markets” strategy. This third party access reform, provided for a very moderate competition in electricity generation. Despite the fact that much of the frustrations and critique of the established regulatory system related to the electricity system, the sector became one of the latest to be turned into a competitive market system. As a matter of fact, the implementation of electricity sector deregulation first started in 1997.

The reason for this relative delay seems to have been the frightening institutional and technical complexity of a physical network based sector with more than 3000 companies. These were ranging from the very large to

the very small, with a mix of private, public and cooperative ownership⁷⁵ with complex contractual and ownership interrelations and with massive and highly specialized government regulations at all levels ranging from the Federal Energy Regulatory Commission (FERC) to the various state regulatory bodies, the power districts and the municipalities. Also because the optimal price theory which had been developed by EdF, had only recently been introduced to the American electricity system, both regulators and most of the electricity economic profession through out the 1970's engaged in work which were rather based on the EdF theoretical contributions than the competitive market approach. In this respect, American developments in the 1970's had much in common with the program presented by Hveding and the coalition government in Norway in 1969/70.

When the debate over deregulation of the electricity utility sector broke through in 1981-82, it reflected in particular the problems which increased inflation during the late 1970's incurred on the industry when the political regulatory system constrained price increases to cover increased generating and distributing costs. The industry reacted by cutting new investments and thereby caused a reduction in technical efficiency, and by complaining over and attacking the regulatory system. (Joskow and Schmalensee, 1985:11-23). But, probably even more important was the successful deregulation of other sectors which added momentum to political and scientific initiatives for electricity sector reforms along similar lines.

Specific theorizing on the prospects for deregulation of the electricity sector emerged from around 1975⁷⁶. From 1981 on, a broad range of papers appeared which discussed the possibilities for deregulation within the sector. A variety of ideas on how it might be organized and detailed discussions of a variety of problems and constraints were presented at conferences, in journals and books. Until this point, deregulation and new approaches to natural monopoly regulations had been treated at a fairly abstract theoretical level of analysis in relation to the electric utility sector, without serious attempts at really digging into the technological and institutional specifics of the sector. From 1980-81, we can say that a scientific research program

⁷⁵ By 1980, 78% of generating capacity was private, 2,5% was cooperative, 9,6 was federal, 5,6% was municipal and 4,5 was owned by power districts and states (Joskow and Schmalensee, 1985:12)

⁷⁶ For instance Walter J. Primeaux Jr.: "A Reexamination of the Monopoly Market Structure for Electric Utilities." In Phillips, Almarin, ed.: "Promoting Competition in Regulated Markets", Washington DC, Brookings Institution, 1975

directed towards deregulation of the electricity sector became established in the US, which aimed at radical regulatory reforms.

The electricity deregulation program in the US has accordingly existed for nearly 20 years, and first by the late 1990's eventually seems to have made a breakthrough into a real world remaking of the sector. Compared to this long lasting process, its numerous theoretical contributions, complex political processes and multi-faceted discussions with participation by numerous scientific, political and sector actors, the Norwegian reform process appears to have been highly simplistic and streamlined with almost no scientific, political or sector controversies.

The Norwegian electricity sector deregulation appears not to have been directly related to the breakthrough of the American debate in 1981-82 and the scientific contributions it produced – even though the two programs became conceptualized at the same time. The specific influences from the American electricity market reform debate and theorizing seem to have entered the Norwegian reform program through research projects at the SAF in Bergen first by 1985/86. Rather the Norwegian electricity market reform emerged from a traditional Industrial Organization research program which focussed on empirical research on efficiency problems within industries, and from the political program for new public management pushed by the 1981 Høyre government. In the broader sense however, the Norwegian electricity market reform was of course influenced by the neo-liberal program and its early regulatory reforms in other sectors. The link primarily came to be represented by the group of economists at the NHH, which came to represent the new main stream of economics in Norway.

8.2 *The breakthrough for neo-liberalism in Norway through credit market reform*

The breakthrough for the neo-liberal program into Norway represented a fairly radical shift in scientific and political orientation. Friedman and the Chicago school had argued strongly for their monetaristic general equilibrium model and had also been permitted to experiment large scale and to develop new economic governance institutions for instance in Chile after the coup in 1973. The model got adopted both by the US and the German central banks already by the mid 1970s. The combination of high unemployment rates, huge government debts and inflation forced governments in the US, the UK, Germany and elsewhere in western Europe to abandon traditional Keynesian economic policies and go looking for alternatives in the wake of the breakdown of the Bretton Woods exchange rate regime in 1972 and the 1973 oil-crisis.

Due to the initial low state debts and the increased debt capacity of the new oil-state, Norway had the economic freedom to go on a usual - until 1978 - an option which turned out to be very costly. At that time, the dike collapsed and revealed a severe economic crisis. In the political process to come, the credit market reform came to represent the overturning of the Oslo School and its post-war governance system, with radical implications for state economic governance practices.

8.2.1 The credit market reform

Both historians, economists and politicians⁷⁷ have engaged in analyzing and explaining the Norwegian credit market reform and the later financial crisis of the banking sector in between 1989 and 1992, which ended with a state rescue operation and take over of the three largest commercial banks. One very interesting analysis of these events is the one by Bent Sofus Tranøy in his study: *“From ‘Oslo-school’-ambitions to neo-liberal visions”*, (1994)⁷⁸. Tranøy traces the breakthrough of the credit policy reorientation back to the economic governance crisis in 1977-78, which in part resulted from an ambitious counter-cyclical economic policy by the AP-government from 1975 to 1978. A political turnaround by the AP government in 1978 is excellently demonstrated by Tranøy to represent a major turning point of the economic, scientific and political orientation in Norway from a domination of the Oslo School towards a new domination of the competitive market school. The initial shift was largely associated with economists in Norges Bank (NB). Tranøy’s historical analysis follows the rivalry between the two schools of thought through the reform process. He outlines in substantial detail the complex interacting transformation process by focusing on the scientific, the political, the institutional, the organizational and the governance technological developments, and by taking the descriptions of these further into explanations within the frameworks of a political science/philosophy of science (Popperian and Kuhnian) theoretical approach which focuses on the paradigmatic change character of the process.

The mediators of the transformation process is taken by Tranøy primarily to be economists in the central bank “Norges Bank (NB)” followed by some of their colleagues in the Ministry of Finance (FD). These are seen as representing a continuous line of historical professional opposition, which

⁷⁷ Axel Damman 1991, Harald Espeli 1992, Trond Reinertsen 1992, Torger Reve 1990, Emil Steffensen og Erling Steigum 1990, Kåre Willoch 1990, Tore Jørgen Hanisch 1996

⁷⁸ My translation

had been pushed back by the Oslo-school to a marginal and weakly articulated position most prominently represented by economists at NHH.

From the early formulations of a new interest rate policy in 1974 within NB, via frustrating attempts to expand and modify the traditional governance technologies of the Oslo-school in the “Krøsus” econometric simulation model, and through the hiring of young economists like Jarle Berge and Einar Forsberg, early neo-liberal initiatives grew into a more founded critique of the traditional theoretical framework and its governance technology. By 1978, a new credit policy program outlined in principal by the NB economists during the autumn 1977, was taken up by the AP-government which for some time had experienced the rise of the severe governance crisis and the frustrating differences between the calculated forecasts of economic policies produced by the complex econometric models, and real world outcomes. At the same time, the government pushed through an immediate “wage- and price stop” legislation which lasted until 1980, intended to cool down inflation and stop the accelerating government budget- and national balance of trade deficits, an act which clearly illustrated the pressures from the experienced loss of economic control by the government. Several state owned industries experienced continued financial distress, repeated rescue operations and eventual bankruptcies, privatization or other sorts of radical restructuring.

The NB economists now got the opportunity, the political support and the resources to present their monetaristic alternative, by mobilizing insights provided by international economic research programs. Supported by the Minister of Finance, the social democratic economist Per Kleppe and his staff – among them his “vise-minister”⁷⁹ the economist Tormod Hermansen - adequate government committees were established which aimed at producing professional and political support for a new market oriented credit policy.

8.2.1.1 *Re-framing the money and credit policy*

The focus of the new approach centered on the role of the interest rate in the economic governance policy. The Oslo-school had been advocating the superior role of “real economic values” in opposition to “speculative financial”, and an active role of state governance in the economy. The Oslo school had represented strong beliefs in substantial freedoms to control the essential input variables through state institutional-organizational systems

⁷⁹ Statssekretær

which permitted for a strong capability for state control and governance with each economic sector of society. Within this framework, money was not primarily seen as a standard market commodity, but rather as an input factor to sector policies and to re-distributive welfare policy. The government was seen to have substantial degrees of freedom to manipulate interest rates and credit distributions by the use of the institutional-organizational systems which had been continuously expanding its technological governance instruments during 30 years.

In opposition to this approach, the NB economists argued in line with Friedman's monetaristic theory, that money should be seen as a standard homogeneous commodity where prices primarily and most efficiently are set in markets. Based on both ideological influences, experiences from the much larger and more complex American economy, the failing socialist economies with very visible black economies and the highly complex and politically unmanageable international financial markets which increased rapidly during the 1970's, the new line of theorizing emphasized the limited ability of governments to prevent "spillovers" and black markets from undermining attempts at government manipulations of the financial markets. Furthermore, such manipulations would decrease social welfare as it would allocate resources to potentially less profitable investments or to consumption where it would be less wanted. Government controls were accordingly not only impossible, but also harmful. The neo-liberals argued that the general equilibrium model was the adequate modeling approach rather than the complex econometric models based on partial sector analysis. They also argued that government interventions should be restricted to supply side economics and interventions by the central banks primarily aimed at the control of inflation. Apart from this, the market would see to it that resources were allocated efficiently between sectors, projects and consumption. The new approach accordingly started out as a radical re-framing of the money and credit policy area based on a different basic model.

8.2.1.2 *Creating a representation of the future end, and strategic transformation of relevant actor networks*

The "Interest Rate Committee" established in 1978, represented a strategic attempt at producing a breakthrough and a new consensus for a monetaristic policy. As the chairman of the committee was appointed Petter Jacob Bjerve, the director of SSB. He had been an assistant and student of Ragnar Frisch at UiO, had served as a Minister of Finance and was a member of the government's "Money and Finance Advisory Committee" at the time. He, in his own person, politically as well as professionally represented the influences of the Oslo-school in the social democratic governance system. If he could be convinced about the new approach, it would provide a strong professional signal and legitimacy to both the social democratic and the

scientific economic communities. With him in the committee were appointed several of those who had been working on the new approach, among them Jarle Bergo who became its secretary and core specialist. Other economists represented the bank association, NB, FD, the trade unions, the Price Directorate and NHH. For the first time since the war, economists at the University of Oslo were not represented in an important government committee on the money and credit policy, which in itself clearly indicates the significance of this turning point. Also the political representatives were selected so as to tactically design a process where the new professional arguments could be able to counter and to overthrow the expected strong opposition and powers of the traditional “low interest rate” policy, in particular within SP, parts of AP and the trade unions (Tranøy, 1994:116-123).

With the availability of data which demonstrated that those with the higher incomes received more benefits from the low interest rate policy than those with the lower incomes, through their higher net borrowings, and by pointing to the “unforeseen” outcome of government rationing that bank managers were implicitly given powers to allocate subsidized loans to “friends and associates”, the re-distribution argument of the established interest rate policy was effectively undermined. The general market equilibrium model and arguments were powerful arguments both in terms of their normative powers and in terms of the authority of the international scientific community which signed up behind them. The arguments substantially discredited the Oslo-school in addition to the severe governance crisis and the Labor government’s support to the new approach.

The Interest Rate Committee arrived at a new consensus and presented what should be regarded as a new program for the future credit policy (Tranøy, 1994:123). At the same time, core representatives of politically and scientifically important institutions had been affiliated with the new program through the educational program prepared within the committee, and became its representatives in the political transformation process.

To the Oslo-school economists, the shift represented both a fundamental defeat and a “back to basic” return to core concepts of their theory which during the many successful years since the war had been “blackboxed” away from dispute; among them the micro-economic market theory and the incentive problems of economic actors. The transformation of the Oslo-school could be done on the basis of principles to be found in the common roots of the neo-classical economic program, and as such they were not completely thrown into the dark, but was able to close the gap to main stream international economics which had turned massively towards the neo-liberal program. Somewhat similar to the moderate market oriented

opposition represented by the NHH economists in the 1960's and -70's, the UiO economists came to represent a moderate hierarchical governance oriented opposition to the neo-liberal program during the 1980's – and as we shall see, also in the electricity market reform case.

8.2.2 From market re-orientation to economic recession and a new AP regime

Tranøy describes how the credit market reform emerged stepwise from the initiatives taken late in 1977 by the AP government, through a re-configuration of the money and credit market governance system, its legislation, technologies, division of roles and practices, via the credit market deregulation reform implemented from January 1984, to the near complete political given up to control interest rates during the two severe international exchange rate crisis in 1986 which occurred in combination with a sharp drop in oil-prices. These developments occurred not without substantial attempts at rescuing the traditional Oslo-school positions and not without political compromises which undermined the ability of the new regime to control the policy implementations of its own program.

A convincing victory in the 1981 parliamentary election for Høyre, led to a conservative minority government headed by Kåre Willoch. The Willoch-government was extended in 1983 by the two parties KrF and SP in order to strengthen the parliamentary basis of the government. Both of these were still substantially influenced by the traditional political “low interest rate” approach and were reluctant to leave interest rates to be decided by the market. During the years 1984 to 1986, the contradiction between a politically enforced low-interest rate policy, which was supported also by the AP in political opposition, and the monetary approach which had opened the national credit market to the international market, forced the NB to supply the banking sector with a massive increase in liquidity to keep interest rates down. This caused a radically expanded credit to the market which “heated up” the economy and created a “financial bubble” which ended in a new economic governance crisis when oil prices suddenly declined dramatically in the spring of 1986. In the autumn 1986, the three-party Willoch-government withdrew and a new Gro Harlem Brundtland AP government took over in November.

The new AP government immediately imposed a 12% devaluation of the currency and a new wage-legislation in cooperation with LO, which forced wage-increases down. It thereby demonstrated a more traditional Keynesian role of the state in the economy. The forceful new counter-cyclical policy however, in combination with an international economic recession, turned

the “overheated” economy into a fairly deep recession with increased unemployment rates and contraction of real estate markets. This undermined the stability of the banking system which had expanded its credits aggressively in the deregulated credit market under the expansionary credit policy. Headed by the new chairman of the State Bank Security Fund: Tormod Hermansen, the state forced a takeover of the three largest commercial banks in Norway in 1992.

The bank crisis in the early 1990s in my view came to represent a substantial reduction of the powers of the neo-liberal program in Norway. It had been demonstrated that the competitive market approach contained dangers to economic stability. The days of innocence and naive beliefs in the “magic” of the market had ended. Ten years of scientific and political initiatives for neo-liberal reforms largely came to an end. From now on further reforms – like in the telecom and the airline industries – largely followed from international pressures or, like in the postal sector, from rapid market developments and technological innovations which gradually pulled the carpet under the established system.

8.2.3 An actor-network theoretical re-interpretation of the credit market reform

The credit policy reform presented by Tranøy, is described and explained in a way rather similar to what would have followed from an Actor Network theoretical approach. The two rival networks of actors; the established Oslo School and the emerging Monetaristic Chicago School, are each held together by their common visions and programs. They include networks of institutions, organizations, theories, governance technologies, humans, parties, etc. that are mobilized to support the expansion of the program and to produce “anti-acts” to undermine the simplifications (blackboxes) and the powers of the rival. The shift followed from the failure of the established collective to pass a real-life market test, which provided a “window of opportunity” to the rival collective which mobilized its international “actants” to re-frame the policy area and to convince the core executive “commanding height”: the Minister of Finance and the government. Tranøy also demonstrates how the expanding collective strategically associated with non-members and transformed them into its own collective in order to create a political breakthrough for the new program in parliament and within the established corporate governance system. This was done by construction of additional arguments and by adding proofs in the form of statistical evidences which undermined the established system and supported the new. After the breakthrough, the collective engaged in re-configuring the governance system, its legislation, governance technologies etc. Finally, Tranøy describes a rivalry situation with many similarities to the rivalry

between Edison and Morgan presented by McGuire, Granovetter and Schwartz, in which the traditional state-hierarchical “low interest rate” collective mobilized and regained commanding heights in 1986, implemented a “reactionary” economic policy, but quickly had to give in because of the powers of the established new professional dominance, the new open market structures and institutional arrangements which permitted international market forces to overturn political initiatives to control interest rates and exchange rates. The sequences of change had become an irrefutable durable system.

The unresolved confrontation between the two programs however, created another economic crisis in the banking sector, which in a second turn undermined the legitimacy and the powers of the expanding neo-liberal program.

8.3 *The New Public Management program and the restructuring of the NVE*

Through the credit market reform process and the rapid decline in political legitimacy for the hierarchical program in broad, the neo-liberal program came to influence economic policy-making during the 1980s. Initiatives and influences from economic research institutions shifted from the UiO/SSB to the NHH/NB, and the FD gradually and partly shifted its associations and orientation accordingly. With the political takeover by the Willoch government in 1981, what was to become known as The New Public Management Program experienced a rapid breakthrough. The Høyre government - and from 1983 the H-KrF-SP government - induced a wave of new public management initiatives under the broad labels “a more open society”, “a more efficient and service oriented public sector” and “deregulation”. Many of these aimed at deconstructing corporate governance systems by separating political responsibilities more clearly from operational, by pulling political powers into the ministries and by turning the ministries into political workshops for the government – in cooperation with external research institutions. Operational entities on the other hand, should preferably be organized according to modern business principles.

A multiplicity of actor-networks were affiliated with and contributed to the expansion of this program at the time. Private business activities increased their political legitimacy and expanded both economically and normatively, state owned industries were privatized and a variety of sectors became objects for deregulation initiatives. Business schools increased their numbers of graduates radically. Business advisors and organizational change advocates expanded rapidly on wave after wave of new organizational and

strategic “fads” etc. etc. In particular business schools like BI, NHH and the regional collages⁸⁰ were important to the education of a large number of human representations of the neo-liberal program. Without this massive influx of educated business economists both to private and public sector organizations, the neo-liberal program would probably have been far less powerful and without capacity to transform activities at local levels.

Important international enunciators of new public management reforms during the 1980s and 1990s were also organizations such as OECD, IMF, World Bank, GATT and the EU Commission. Through these organizations a multiplicity of specific reform programs were pushed on to their member-states.

The neo-liberal “more markets – less state” program appears in part to have entered the electricity sector from the ambition of the conservative government to improve state administrative efficiency through structural reforms in the state administration and in other state economic activities. The target for such a reform in relation to the electricity sector was the NVE. The administrative system of the NVE had maintained its integrated structure through various waves of reforms in ministry-directorate relationships since the conflicts over the organization of NSB and NVE in the early 1920’s. Finally, the integrated structure was to be deconstructed. The ambition of the government was on the one hand, to separate the business-like activities which was organized in the internal NVE department “Statkraftsverkene”, by turning it into a state owned business oriented company - preferably organized as a joint stock company. On the other hand, the policy role of the board of NVE, should be lifted into the OED, which was to hold the role as the political “workshop” for the government at a larger distance from sector interests - in concordance with George Stigler’s regulatory capture argument. First, however, I will step back a little, to present some of the important changes in the state administration of the electricity sector which had already been conducted under the AP-government.

8.3.1 Re-organizing the state electricity sector administration

In 1978, under the pressures of the economic governance crisis and the rapidly expanding petroleum activities in the North Sea, the AP-government decided to establish a new Ministry of Oil and Energy (OED) in order to increase its administrative and governance capacity. By this event, the electricity sector was moved from the Ministry of Industry to the new OED. The electricity sector thereby became administratively separated from the

⁸⁰ distriktshøyskolene

area of industrial politics under which it had largely served as an input sector, and became a more autonomous policy area associated with energy politics. This restructuring also pulled the sector closer to the newly established and international market oriented oil- and gas industry - closer to a state sector administration more dominated by economists.

The OED received particular attention from the Ministry of Finance due to the importance of the large state revenues from the oil-and gas sector. In this way, the electricity sector came to be more closely compared to the highly lucrative petroleum sector - a comparison which made revenues from the electricity sector appear rather microscopic. In particular, it appeared that the electricity sector was incapable of extracting any substantial resource rents to state budgets. The administrative change did however not have any immediate dramatic effects on the traditional orientation of the electricity sector administration, as the staff largely came from the ID and the NVE. But, the change obviously made the sector more accessible to the later reformers, easier to associate with, to capture and to transform, and it turned a state financial perspective on the sector more into focus rather than the industrial perspective which had dominated since 1946.

In a state financial perspective there is – in general - not only the question of how economic principles about efficient pricing and investments should be implemented and managed. An important issue is also how returns from investments can be increased and in particular, how this return can be allocated to state budgets rather than to the electricity sector companies, the energy intensive industry, the consumers or the municipalities. Within the perspective of the social democratic “renewal” program after 1986, which aimed at increasing the economic solidity of the welfare state, the state financial perspective on the electricity sector became important. For obvious reasons it remained rather redundant in relation to the market reform process, and first came into focus during the electricity sector tax reform in 1995/96.

The state financial perspective however also pointed at the need to redefine the sector from a non-commercial to a commercial sector in order to create a basis of legitimacy for increased state taxation of the sector – in addition to increased capital returns from direct state investments. The political role of and status of the electricity companies as not-for-profit political-administrative institutions severely constrained the legitimacy of the state to collect taxes from the sector. A reform which altered this role and status of local political institutions in the direction of a commercial business-like interpretation, would accordingly be welcomed by the FD and the AP government. Hence, both the neo-liberal program and the state economic perspective contribute to explaining why the AP government, FD and its top

civil servant from 1986 on, Tormod Hermansen, became important advocates for the electricity market reform⁸¹.

8.3.1.1 Restructuring the NVE - and its accounting system

Following criticism from the political opposition in parliament, from within the electricity sector itself and from the environmentalists towards the mixing of state regulatory and state market operational responsibilities, the AP government in 1980 established a committee headed by Lars Leiro to have a closer look at the organization of the NVE. The report, NOU 1982:19, was presented in June 1982. The majority in the committee argued that the NVE should remain an integrated administrative unit, but that the department Statkraftverkene should be organized more independently with its own administrative functions. The minority argued instead that Statkraftverkene should be separated and organized as a state owned joint stock company. The challenge for the new Høyre-government accordingly, became to produce sufficient arguments for the more radical approach.

To the new government, the restructuring of the NVE became part of a larger plan to restructure the four large state sector companies NSB, Postverket, Televerket and NVE/Statkraftverkene, to end the implicit state subsidies, to expose them to market pressures and to increase capital returns. The credit market reform had led to increased interest rates – also to the state. While the state companies in 1980 paid 7,4% interest to the state, the cost of state borrowing had increased to 13%. NVE was by far the largest borrower of the four companies, and interest rate subsidies to the NVE alone could be calculated to around 3 billion NOK a year. Additionally, the state companies were granted free loans the first 1,5 year after the investment had been completed (Barth Jacobsen, 1998:147).

Apart from adjusting internal interest rates to market rates, the government introduced new accounting principles, which turned out to add important “loads” to the efforts to undermine the credibility and trust in state governance of production companies. Traditionally, hydro-power investments had been written down over 40 years according to a linear principle. From January 1st 1982, a new “saldo-system” was introduced according to which most of the investment was written down in 10 years. Consequences to accounting results were dramatic with the completing of a number of large state hydro-power constructions by the mid-1980s. The

⁸¹ The electricity market reform was followed by a tax reform within the electricity sector implemented from January 1st 1997.

numbers went into red and thereby demonstrated the inefficiency of the established system.

The coalition government supported the minority view of the Leiro-committee in its proposition to parliament. The conflict in parliament emerged primarily on the issue of organizational form. With a joint stock company, the ability of the parliament to interfere politically into the sector would be radically reduced, as substantial operational governance rights would then be handed over to company management. A joint stock company form would also open up the agenda for a possible future privatization of the state company. This consequences, in addition to the trade unions' lobbying for a continued strong political responsibility which provided for their ability to surpass both management and government through direct political channels to the parliament, eventually led to a defeat for the government on the joint stock company issue. Statkraftverkene became organized in an intermediate organizational form - into what was denoted a "semi autonomous state company" directly under the OED. The parliament approved the proposition to reorganize NVE in 1985, and Statkraftverkene became separated from the NVE from January 1st 1986.

Through this restructuring, the large state power company Statkraftverkene, which controlled approximately 30% of national electricity production, 40% of generating capacity and 50% of hydro-reservoir capacities and around 85% of the national grid system⁸², had become a semi-separated organizational entity instructed to follow commercial objectives alone. Commercial and regulatory roles had been separated at the state administrative level. This was an important initial step towards a neo-liberal governance model for the entire electricity system – but by far a conclusive one.

Within the NVE, the separation had been support by Statkraftsverkene itself and its director Sigurd Aalefjær, who since long had been arguing for a more independent responsibility directly under the ministry rather than having the board of NVE in between (Thue, 1996). The traditionally strong governance board of NVE with a core role in the corporate governance system, now became reduced to an advisory board with no substantial political powers.

The rest of NVE was maintained as a directorate outside the ministry with operational responsibilities for the various regulatory and planning functions related to the waterways and the electricity sector. During the restructuring

⁸² Sentralnettet

process, the NVE lost many of its competent employees to Statkraftverkene, and the Ministry of Finance engaged actively to obtain further reductions in the staff. NVE director general Sigmund Larsen retired from his position in 1986. The NVE was left with substantially reduced powers, capacity and status as well as with continuous pressures to defend its remaining resources in a situation where – as we shall see - the hierarchical and the market reform alternatives confronted each other within the state administrative and political arenas.

In 1987, Erling Diesen, who had been employed by NVE from 1961 to 1978, was offered the position as the new NVE director general after Sigmund Larsen. Diesen had served as the full-time chairman of the Energy Law Committee for two years and came from the position as the general manager of the regional power company Buskerud Energiverk. Being a core representative of the hierarchical restructuring reform collective, Diesen engaged actively in the organizational restructuring program, for instance through the so called “20-men’s club” which contained the general managers from the largest power companies. Within this forum, the hierarchical restructuring actor-networks mobilized efforts to maintain momentum behind the hierarchical reform initiative, to push for regional restructuring and to guard institutional order in the electricity sector which had increasingly come under pressure from the effects of overcapacity in generating capacity. Until 1991/92, the club served as an important forum for sector coordination and hierarchical restructuring initiatives in the sector, where after it was dissolved as the new market regime destroyed its legitimacy.

8.4 From credit market and new public management reforms to electricity market reform?

From its international roots in economic theorizing, I have now followed the neo-liberal market program from some of its early breakthroughs internationally, back into Norway, through its initial overturning of the established post-war state-hierarchical collective during the credit market reform process and through the wave of new public management reforms in the early 1980s. This expansion of the new economic approach certainly represented an important precondition for the later electricity market reform – through the very broad re-orientation it produced. But there were also some very specific sequences of developments and relationships between events, actors and programs which provided more direct links to the later electricity market reform program, namely the credit market reform, the new public management reform of the state directorate NVE and the relative shift

in state partnership with the economics profession from the UiO to the NHH economists.

Another route of development started from the establishing of the new Ministry of Petroleum and Energy in 1978, which associated the electricity sector closer with the petroleum sector and which turned a “state financial return on energy resources” perspective more into focus also in the case of electricity. With the ambitions of the 1986 AP government to renew and strengthen the basis of the welfare state, pointed directly to a neo-liberal market reform program in combination with an electricity sector tax reform.

In the broad perspective of the neo-liberal market program, the credit market reform can be seen as representing the first out of three major market reform projects, focussing on the three most significant economic resource variables in the Norwegian economy; capital, labor and electricity (energy). By 1984-86, the capital market reform had been completed. After some scattered and not very successful efforts by the conservative and the coalition governments to embark on labor market reforms, electricity became the obvious candidate for a further major expansion of the neo-liberal program⁸³. This became even the more obvious as the political difficulties involved in challenging the trade unions with radical labor market reforms under the new AP government in 1986, became quite evident. One could accordingly argue that the tremendous relative importance of the electricity sector in Norway provided for an important link or association between the credit market reform and the later electricity market reform, which concentrated and mobilized scientific and political-administrative actors and resources behind the latter reform initiative. This link may have been particularly evident to the NHH economists, who had taken the professional initiative and who mobilized research and policy advice activities to expand the market program further.

There were also important conceptual and theoretical similarities between the capital- and the electricity policy systems. Under the state-hierarchical regime represented by the “Oslo school of economics”, the credit policy and the electricity policy were both primarily seen as input factors to industrial growth and economic redistribution policies, which could and should be manipulated by the government in order to allocate resources in accordance with political preferences for industrial growth and economic justice. Interest

⁸³ There were several initiatives to establish a more competitive market based wage-formation at the time – in particular for managers within the state sector. With the 1986 AP government, these initiatives were stopped.

rates and electricity prices were in this sense conceptually identical. The reshaping of one of them became an argument for the reshaping of the other.

The new public management initiatives and in particular the restructuring of the NVE also became important to the later reform process through their demonstration of changes in the perceived rules and roles of the game between economic organizations and state policy-makers and regulators, and through their adding to the destabilization of the established post-war state hierarchical program. They broke apart the traditional corporate governance model with its multiple political objectives and “negotiated economy” practices. The entire new public management program represented a program for the externalization of not-for profit objectives from public sector economic enterprises, and a concentration of responsibility for these externalities in the ministries and in directorates which became re-configured in accordance with the role the state regulator in economic theory. The 1985/86 reform of the NVE represented an early re-structuring of the state-administrative system in accordance with the neo-liberal program; Statkraftverkene became fundamentally but not completely disentangled from non-economic objectives and the rest-NVE became a candidate for further re-configuration and re-formatting into a proper state economic regulator.

With the NVE reform, the hierarchical restructuring collective – the major rival to an electricity market reform alternative - had become partly invaded. Its integrated stronghold NVE-Statkraftsverkene, became separated, its influential board of the NVE was stripped for political institutional powers and transferred to the ministry, substantial pressures were maintained to reduce NVE staffs and budgets, and the managerial legitimacy of Statkraftverkene had become severely shaken by the combination of credit market deregulation and an accounting reform. On the other hand, the transformation was obviously not complete and contained important compromises – in particular on the issue of organizational form, which reflected a rather broad political reluctance towards what might lead to a future privatization the electricity sector.

One could possibly also argue that the state-administrative reform of the NVE - in a second turn - influenced thinking – or supported a re-thinking - within local and regional power companies and added momentum to ongoing business oriented transformations. This occurred in particular within a number of electricity companies in the south-eastern part of the country. Some of these – like Oslo Lysverker, Bærum Energiverk, Lier Energiverk and Vest-Agder Energiverk engaged in business oriented organizational reforms in the second half of the 1980s, and thereby adopted role interpretations fairly similar to the roles they were later given by the

electricity market reform program; that of the profit seeking competitive firm disentangled from not-for-profit objectives.

The presentation has also introduced and followed some of the key actors which gradually mobilized behind the electricity market reform initiatives. In particular, we have noted a man called Tormod Hermansen, who appeared to “pop up” in core positions along the sequence of events that I have discussed – both in the credit market reform and in the new public management reforms. But also the right wing political parties, actors within the state administration, the “modernists” within the AP and the NHH economists were among those who mobilized for further neo-liberal reforms.

9 Einar Hope and the entrepreneurial electricity market reform collective

Having described and discussed the electricity market reform approach from the point of view of developments within economics and from early market oriented reshaping of the economy projects, we shall now shift attention to obtain a third description. This time I will focus directly on the electricity market reform collective as it gradually emerged at the Center for Applied Research (SAF) in affiliation with the Norwegian School of Business Administration (NHH) in Bergen, on its enunciator Einar Hope, the research program he formulated and the networks he mobilized and coordinated to advance it.

From the presentation in chapter 7, we already know that Hope and his colleagues at NHH had been introduced to the early electricity economic program represented by Vidkunn Hveding around 1965-67, and that Hope from the point of view of an industrial organization perspective became interested in doing empirical research on the new occasional power market established in 1971. From these early events and initiatives, what was to become an operational alternative with substantial professional authority behind itself grew into filling the open space left by other reform initiatives within the sector, and to link to those forces and early economic reform projects which emerged from the market re-orientation within economics at large.

I will follow this construction work through some of its major projects in order to answer questions such as: How did such an alternative actually emerge? What were its relations to the electricity sector? When was it actually established as a market reform program? What were the core elements in the program and in the actor-networks associated with it? Did it relate specifically to other electricity market reform programs like the American that I have presented in brief, or the British? Or did it emerge more or less as a separate approach? How was this entrepreneurial collective expanded from an interest in doing empirical research to a market reform collective with substantial capacities to reshape a large sector of the economy?

I will essentially argue that Hope's program provided an answer to Hveding's argument that there was no operational market at large on which a system based on the SRMC pricing principle could be implemented. Rather than from abstract discussions however, the operational alternative emerged out of direct interactions by economists into efforts to solve certain acute economic problems at the operational level within the electricity sector. It

emerged from a mix of empirical research and real life problem solving in which economic theory provided broad, in principle guidelines and concepts which could be applied in an incremental, innovative and entrepreneurial style which involved a variety of network constructing activities. Among these, constructions of scientific organization and scientific authority were particularly important.

9.1 *The Industrial Organization program at the SAF/NHH*

It was at the NHH/SAF in Bergen that ideas about a full scale market based electricity system was first formulated, and it was this research institution which came to play the professional scientific role in the reform process. Of particular interest here is the role of Einar Hope both as an important enunciator of the market reform and as a core networker in between an industrial organization research tradition, the economists at NHH, state administrators and the electricity sector.

His role in what was to become the market reform process can be said to have started from a large research program within the scientific area of Industrial Organization at NHH in the 1970's, and from the establishing and expansion of the SAF, where he served as its director. Through the 1980's the SAF grew into a position as perhaps the most influential economic research center in Norway at the time, with a strong academic profile and tight relationships to the state central administration. In relation to various industries, the SAF took on the role as a scientific advisor to state directorates and ministries. In this respect, it might be seen as somewhat in a similar position as the economic department at the UiO and the SSB in between 1945 and 1978.

9.1.1 The “structure-conduct-performance” approach to electricity sector studies

Einar Hope was educated as an economist at NHH. During the late 1960's and early 1970's he specialized in what at the time was a rather marginal area of economic theorizing in Norway as well as internationally; the Industrial Organization Theory (IO) largely affiliated with the American “structure-conduct-performance” tradition. Hope became familiar with these ideas during his stay at the University of Minnesota (1967) and at the University of Cambridge (1971-72). Supported by professor Gerhard Stolz at NHH, Hope during the 1970's headed a large empirically and educationally oriented research program at NHH aimed at investigating a variety of economic sectors in Norway. Through this work, both Hope and his colleagues developed a broad basis of empirical knowledge about a variety of Norwegian economic sectors structured by the IO-theory which

concentrated on structural and micro-economic problems. The early tradition focused particularly on the dynamic character of the market mechanism and on the relationship between market structure, actor behaviors (incentives) and economic efficiency outcomes. As such, the tradition differed radically from the econometric tradition at UiO. The micro-economic theoretical approach and the search for structural changes which might contribute to efficiency improvements rather than state directed macro-economic reallocations, turned the electricity general supply system and the internal occasional market for power into focus as a particularly interesting area for empirical investigations.

Internationally the IO research program achieved increased scientific and political interest in response to the economic governance problems acknowledged in the early 1970's, and as a consequence of the introduction of mathematical game theory to analysis of industrial organization problems. The demand for research and policy advises led to initiatives to organize research activities both by the state and by the academic community in Bergen in which the IO research area came to play a major role.

9.1.2 The significance of scientific organization and scientific authority

In the early 1970's the research program headed by Einar Hope became organized as an internal research center - SAF - at the Institute for Economics at NHH. In 1976 however, the Ministry of Industry established Institute for Industrial Economics (IØI) as an independent state research institute located close to NHH, and Einar Hope was appointed its managing director with the ambition to initiate sector oriented economic research programs which could serve as knowledge basis for government policies. Two years later, in 1978, Hope left the IØI after internal disputes with the board over the academic profile of the research activities, where Hope strongly had argued that research practices should be closely tied to the high standards of academic research, where as the board had argued for a more pragmatic policy-advisory profile. As a consequence, the research community at NHH decided to push the SAF as an alternative and appointed Hope as its research manager (Mathiesen and Sandmo, 1997:189-192).

In 1984, the SAF was formalized as a separated research foundation outside the NHH. This choice largely followed from the need to circumvent the tight administrative and economic constraints which followed from the state ownership to NHH. From this "outside" position, professionals from within the NHH could be engaged in externally financed research projects and receive payments outside tight state wage-regulations.

The academic actor-network affiliated with the IO scientific program, accordingly managed to establish an institutional-organizational structure headed by one of its core academic professionals, where high academic standards could be controlled and where a broad range of researchers from the state owned business school could be recruited on a project basis. At the same time, it remained in close affiliation with state institutions which increasingly demanded knowledge, political advice (or scientific legitimacy?) to its economic policies. SAF and Einar Hope in this way became the core actors in a rapidly expanding Norwegian IO research program with a substantial capacity to mobilize academic resources within NHH and direct these to a variety of economic sector studies.

Through the new research institution, the research community at NHH were able to mobilize economic resources to increase both their research staffs and their empirical and theoretical research activities, and state governance institutions as well as various other economic sector oriented organizations got access to a well organized academic research institution structured and coordinated by Einar Hope. In this sense, it served as a useful institution in both scientific and political entrepreneurial collectives – both as an actor and as an organization acted upon.

Apart from governing the SAF, Einar Hope also conducted several research projects himself, in particular in relation to the electricity sector and in the area of regulation of competitive markets, where he later became a dominant scientific contributor to the new competition law which was implemented in 1993 (Mathiesen and Sandmo, 1997). Because of his particular interest in the electricity sector, he established relations to economists with specialized interests in electricity economics, and through applied research projects, he managed to mobilize a variety of disciplines into electricity sector research activities - including a group of young industrial organization specialists on “market imperfections” and “regulation and control” theory.

In 1991, the Ministry of Industries⁸⁴ and the SAF jointly established the Center for Industrial Economic Research (SNF) by merging SAF, IØI and a Center for International Business (CIB) at NHH. Einar Hope was appointed managing director of the new large research institution, a position he held until 1995 when he took over as the director of the state competition authority. By 1991 the SAF had grown into a dominant applied economic research institution in Norway with substantial academic authority and credibility. It represented a core institutional structure in a scientific network

⁸⁴ Næringsdepartementet

which affiliated a broad range of economic researchers both at NHH as well as at the UiO (SAF-Oslo) and to a growing extent also at the District Colleges (DH).

A variety of aspects contributed to the emergence of a powerful role for the SAF at the time – in addition to strategies and actions carried out by its constructors. First and foremost, there was the increased demand for sector analysis and policy advises which followed from the breakthrough of the market reorientation both within political and industrial communities, and the new public management initiatives pushed by the governments of the early 1980s. This permitted for a rapid growth in empirical and analytic research projects financed by the Norwegian Research Council, industries and government institutions. Second, there was the rapid expansion of the industrial organization theory internationally which attracted young Norwegian researchers to specialize within the program. Many of these were financed by and trained in the SAF research activities. Third, there was the role of state ownership to NHH which on the one hand “forced” the external research organization of SAF and - at least partly because of that - an organization with a capacity to integrate research activities across scientific disciplines, and on the other hand, provided the SAF research institution with a role as a close research counterpart to the state at a ministerial level of governance rather than at a directorate-sector level.

SAF gradually became a joint academic-state project despite the controversies over the IØI research policy in 1978, a controversy which ended with the success of the SAF and finally with the joining of SAF and IØI in 1991. No doubt, Hope’s insistence on a demanding scientific profile and perhaps also his own personal style, had given SAF a strong reputation for correctness, reliability and scientific professionalism which turned it into a highly powerful “policy advice” unit which reinforced its attractiveness to the actor-networks it hold on to and by which it was being supported.

9.2 Re-framing the electricity system: The market reform program

In April 1982, Einar Hope at a seminar in the state research council NTNF presented a research program directed towards analyzing micro-economic structures and behaviors in the electricity market, which pointed at a more general market oriented reform program. The ideas were later presented in

an article in “Statsøkonomisk Tidsskrift” 1983 called “Markets for power exchange in Norway: An in principal discussion”⁸⁵.

In the article Hope pointed at the need to study how market actors reacted to changes in administratively set prices, how market equilibrium was actually achieved under such conditions and what happened when markets did not clear. He also addressed the issue how incentives could be created to induce actors to behave rationally in the short as well as in the long run so that one through micro-decisions could achieve the wanted results of the energy economic policy. Hope furthermore presented what appears to have been his main critique of the established institutional system; the limited flexibility in pricing that resulted from the segregation between the “firm power market” and the “occasional power market” and the lack of appropriate markets and instruments for risk management to be used by individual power companies and consumers. These viewpoints grew directly out of his research on the functioning of the occasional power market in the late 1970s. While pointing at the observed differences between the established institutional-regulatory system and the standard micro-economic ideal model, he also argued that changes might not need to be dramatic and could be achieved through various institutional adjustments (Hope, 1983:43-62).

The immediate background was his observations from the electricity market, that substantial new capacity and large unpredictable variations in supply and demand conditions caused high risk exposures and large financial losses to actors. Already in 1978/79, he had suggested to introduce a futures market which would make it possible to reallocate risks more efficiently across actors⁸⁶. With the emerging over-capacity, focus turned to the more general market balance problem, the continuous large price differences between the firm power market and the occasional power market and the related conflict between sellers and buyers over the authority of the fixed price contract regime which constrained the ability to increase purchasing through the low price occasional power market.

Hope’s arguments were closely in line with traditional positions among the economists in their pointing at the important relationship between the occasional power market and the firm power market as a market equilibrium relation. What was new, was his pointing at the need to study how economic actors actually behave at the micro level of analysis when prices in the two

⁸⁵ Hope, Einar (1983): “Markeder for kraftomsetning i Norge: En prinsipiell drøfting”, Statsøkonomisk Tidsskrift, hefte 1. My translation

⁸⁶ Interview with Einar Hope, 20.11.98.

markets do not converge over time due to political-administrative interventions into prices, and his pointing at new operational market systems to deal with at least some of the problems observed. His basic point of reference was the competitive market model in economic theory which defined the optimal resource allocation under specific assumptions. We also note that Hope's ambition was not only to establish new competitive market systems to manage specific problems, it was also to "improve the rationality of economic actors", which could be done by designing market systems and organizational forms (with specific incentives) which induced them to take what he saw as "rational economic choices". In this sense, the program he suggested was both about the construction of and expansion of markets and about the re-framing and re-shaping of economic actors in accordance with the rationality standards of economics.

The ideas outlined in 1982 /83 sketched some of the main elements in the later electricity market reform program, but it did not present any outline of an alternative system. Neither did it directly confront the approach represented by Hveding through for instance an explicit critique of the long term marginal cost pricing principle, nor address the efforts to achieve a hierarchical organizational reform. At the time, it was essentially a scientific research program, possibly with certain practical, incremental implications for electricity trade practices.

Hope did also not include any references to international discussions on the subject of electricity market reform or other deregulation projects in his article. He was the single author, and the only colleague who was referred to as a provider of comments, was his colleague, professor in economics Agnar Sandmo⁸⁷ at NHH. The word deregulation was not even mentioned, and there are no obvious signs that Hope had a general and large scale market reform in mind rather than a search for better knowledge and possibly a gradual introduction of new market elements.

Hopes' article clearly confirms the impression that his research program mainly grew out of his empirical research and the theoretical perspective he had developed during the -70's based on the early structure-conduct-performance tradition, rather than from for instance the American debate on electricity market deregulation that I have presented briefly in chapter 5. It is also apparent that his micro-economic approach emerged fairly independently from the traditional area of electricity economics. On the

⁸⁷ Agnar Sandmo is probably one of the most influential Norwegian economists in the 1980s and the 1990s.

other hand, it had much in common with the general approach of the EdF researchers in the 1940s and -50s in their close interaction with the real world electricity system and their combination of economic theorizing with pragmatic search for operational improvements to system design and economic governance systems.

9.2.1 Investigating established systems and behaviors: The Statkraft project

Neither the FD nor the OED paid any particular attention to Hope's ideas before 1986⁸⁸, but SAF received financial support for research projects from the Norwegian Research Council (NTNF) to carry out the research program. The first research project was named "Markets for power exchange in Norway"⁸⁹ and was financed by NTNF and NVE-Statkraftsverkene jointly. As a part of this project, SAF became engaged by Statkraftverkene (which at the time still was a department within the NVE) in a special project aimed at analyzing possible market strategies for the state institution in the "occasional power" market.

The research project became structured into various sub-studies which presented different reports. These ranged over providing an overview of the existing trading system⁹⁰, a description of established pricing practices⁹¹, a survey-analysis of decision behaviors in the occasional power market⁹², a theoretical analysis of the operational decision problem of a single power company⁹³ and a discussion and critique of the established governance system for national optimization of electricity generation⁹⁴. These reports were followed by a discussion of the established electricity trading system,

⁸⁸ Interview with Einar Hope, 20.11.98.

⁸⁹ My translation

⁹⁰ Bauge, Bernt Einar and Einar Hope, 1983: "Det norske kraftomsetningssystem: En oversikt", SAF, arbeidsnotat nr. 10

⁹¹ Asheim, Geir B. and Terje Lensberg, 1984: "Prissetting av elektrisk energi", SAF, Rapport nr. 1,

⁹² Berg, Morten, Cato C. Adrian, Torstein Hole and Einar Hope, 1984: "Beslutninger om tilfeldig kraft: En spørreundersøkelse", SAF, arbeidsnotat nr. 10

⁹³ Sandvik, Bjørn: "Driftsproblemet for et el-verk", SAF, internt notat

⁹⁴ Samkjøringsmodellen

of the constraints on the occasional power market in its present form and a critique of the lack of overall price-flexibility in the electricity market.⁹⁵

In their main report, Einar Hope and Sigurd Tufte⁹⁶ presented a fairly detailed analysis of the electricity markets and a critique of the current institutional trading system – including the role of Statkraftverkene in the market. They pointed in particular at the complexity which resulted from conflicting political objectives – in particular the tradeoffs involved in the role of Statkraftverkene in industrial and re-distributive economic politics as opposed to its role as a state commercial enterprise aimed at maximizing economic returns. This mix of political objectives was at stake with the rationality concept in economic theory, and was thereby seen by the authors as “irrational”. This essential critique pointed at externalization of non-efficiency objectives from the area of decision-making by the market actors as the fundamental route to rationality as well as efficiency improvements.

Much concern was also given to the way foreign trade with electricity was organized. The authors criticized the “inappropriate” economic incentives related to the institutional arrangements between Statkraftverkene and other members of Samkjøringen in relation to the foreign markets, where Statkraftverkene had a trade monopoly, but where gains from this trade were to be distributed to all the members of Samkjøringen. They demonstrated how this arrangement caused complicated and apparently “irrational” strategic games between the generators and Statkraftverkene with in-optimal outcomes in terms of resource allocation. They also pointed at how these complexities made it difficult to define a “rational” market strategy for Statkraftsverkene - both for system development and for operational trade purposes.

The report supplied Sigurd Aalefjær and his top managers in Statkraftverkene with scientific economic arguments for a more independent and economically “purified” organization of the state enterprise. Despite a few angry opponents to Hope’s arguments, the report appeared to be well received by the leadership of the state directorate⁹⁷, which by 1984/85 had

⁹⁵ Berg, Morten, 1985: “En skisse av markedstilpasningen i norske kraftverk”, SAF, arbeidsnotat nr. 1

⁹⁶ Hope, Einar and Sigurd Tufte, 1984: “Markeder for norsk kraftomsetning: En analyse av Statkraftverkernes markedsstrategiske tilpasning i omsetning av tilfeldigkraft, SAF rapport nr. 6.

⁹⁷ Interview with Einar Hope, 20.11.98

really started feeling the pressures from the new public management initiative of the government to reorganize the NVE and business-organize Statkraftverkene. I think it is fair to say that Einar Hope/SAF in this way played a role also in the 1985/86 NVE reform, by providing scientific arguments to the political-administrative decision process within the directorate.

On the other hand, the report was very critical to various roles of Statkraftverkene in the electricity system. During the electricity market reform process to come, much of the tension occurred between Hope and his associates who argued to abolish the various “unique” roles of the state company in different parts of the electricity system, and representatives of Statkraftverkene who struggled to maintain a dominant role for the company in the future electricity system. When Gunnar Vatten moved from the OED and took over as the CEO of Statkraftverkene in 1986, Statkraft became perhaps the most important commanding height for Vatten, Vinjar and Diesen’s hierarchical restructuring collective which became the major rival to Hope’s market reform alternative.

9.2.2 Electricity economic research projects at SAF

In 1985, Hope and Morten Berg - a NHH economist who was employed as a researcher at the SAF - applied and got financial support for another research project. It was named “Prices and costs in power distribution”⁹⁸ and represented a deliberate effort by the SAF to further increase its competence in electricity economics and to establish a solid micro-economic theoretical foundation for its research into a more market oriented electricity system. The project was headed by Morten Berg, started out in January 1986 and presented several reports in the winter/spring of 1988. Within this project, economists from both NHH and UiB were engaged in discussions and writings on a variety of theoretical contributions related to the various parts of the hydro-power based system - and to taxation and resource rent issues.

Through this project, SAF economists, and in particular Morten Berg, got the opportunity to dig further into the modern international scientific field of electricity economics as it developed during the 1980’s. The contributions pulled upon, ranged over the early French and American traditions to recent developments within economics such as theories of market imperfections, second best solutions and developments within economic modeling like

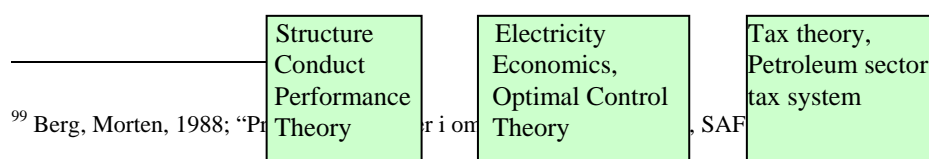
⁹⁸ My translation

optimal control theory⁹⁹, which permitted for a more sophisticated modeling of uncertainty over time than what had been developed by Pierre Massé in the 1940's. Through this project, the Norwegian market reform program became more closely affiliated with the international - in particular the American - scientific work on deregulation of electricity systems and economic system design¹⁰⁰, not by engaging in the discussion of deregulation in the broader sense, but rather through the more technical, mathematical contributions to this debate - contributions which were important to the analytical sharpness, to the scientific status and authority of the market approach among economists – not at least in relation to the group of electricity economists at UiO - and to the ability to produce specific in principle guidelines upon which an operational reform of a highly technical and complex industry could be designed.

Another important report within this project, was the one by Eirik Schrøder Amundsen on “Resource rent and economic adjustments in the electricity sector”¹⁰¹, which outlined principles which had been theoretically discussed and applied to the Norwegian oil and gas sector and which later came to be core elements in an electricity sector tax reform which followed the market reform and which represented a major interest to the FD-administration.

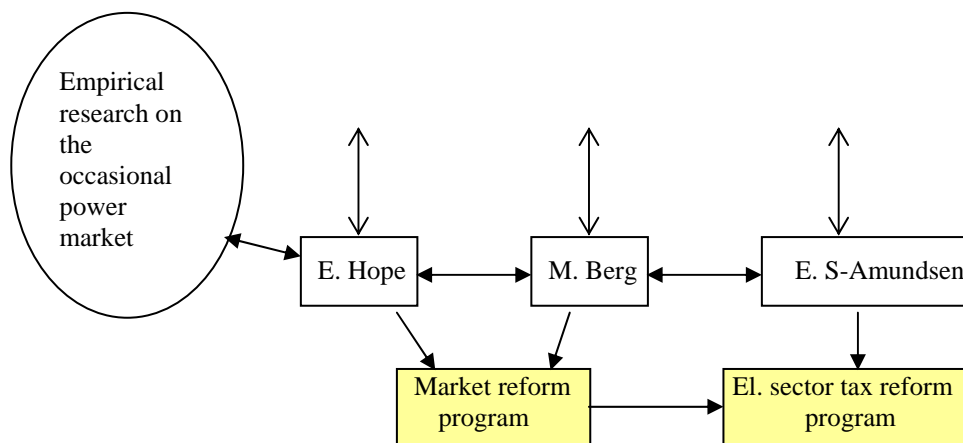
Through these reports many of the theoretical contributions to the market reform program had been collected, described and linked together. The program was hardly at all made up of unique new concepts. It was a rather a unique linking of different contributions from various areas of economic research.

Figure 9.1. The construction of a specific electricity market reform program at SAF



¹⁰⁰ Important influential references on market approaches seems to have been Bohn, Caramanis and Schweppe, 1984: “Optimal Pricing in Electrical Networks over Space and Time”, Rand Journal of Economics, vol. 15, ss 360-376, Chao, H-P, Oren, Smith and Wilson, 1986: “Multilevel Demand Subscription pricing for Electric Power”, Energy Economics, vol. 8, ss 199-217, and Wilson, R.B., 1986: “Efficient Pricing and Market Organization of Priority Service”, Stanford University.

¹⁰¹ Amundsen, Eirik Schrøder, 1988: “Grunnrente og økonomisk tilpasning i elektrisitssektoren”, SAF rapport nr. 16. My translation.



9.2.3 Framing a market based system and attacking established practices

The first policy oriented project directly ordered from the state administration came from the OED in early 1986. In this project SAF was asked to provide a scientific judgment of the formulations given in chapter 6 in the government's parliamentary report no. 71 (1984-85): "Norway's future use of energy and energy production". The chapter was called "Price policy and energy economizing"¹⁰². The report from SAF¹⁰³ was written by professor in economics Kåre Petter Hagen and by Morten Berg and Einar Hope, outlined their critique of established principles and practices within the electricity sector and presented the market based approach to electricity pricing and investments, tariff principles and electricity trade in general theoretical terms.

In the report, Kåre Petter Hagen outlined the critique of the long term marginal cost principle in relation to electricity pricing which had already been noted by the economists in the early 1970s. He argued by the use of standard economic theory, that the alternative cost principle should be

¹⁰² Both are my translations

¹⁰³ Berg, Morten, Kåre Petter Hagen og Einar Hope, 1986: "Elektrisitetspriser og energioekonomisering", SAF rapport nr. 7

applied in general, which meant that short term marginal costs and consumer willingness to pay should be the only relevant factors to pricing, where as the long term marginal cost principle was only relevant to investment decisions. Both investment costs and calculated rate of return, which had been at the core of the disputes over state electricity pricing, should accordingly be seen as irrelevant to pricing. This far, he provided nothing more than traditional arguments from the economists. He continued however, by focussing on the problem of risk management to individual actors within the system and argued that the established divided system with a market for firm power with administrated prices and another market for occasional power with flexible prices which absorbed the entire market uncertainty, need not be the most adequate way to solve the uncertainty problem.

“The problem seems rather analogous to what we have in the currency market with fluctuating exchange rates. Here, actors can hedge against fluctuations in future exchange rates by transactions in termin markets, and it is natural to raise the issue whether something similar possibly could be organized in the electric power market”

and a little further down the page:

“An alternative way to organize the electric power market could be to base all trade on market equilibrium prices and then establish possibilities for hedging for those interested in eliminating the risk from fluctuating prices. A closer analysis of this would expand beyond the framework of this paper” (Berg, Hagen Hope, 1986:22)¹⁰⁴.

The quotes both demonstrate the new re-framing of the electricity sector now advocated by the NHH economists and the association between the credit market and their re-framing of the electricity market. Rather than hierarchical control with prices, the entire system should be reshaped into a single market system where risks could be managed by standard financial instruments.

The contribution by Morten Berg was largely to outline the principles of marginal cost pricing applied to electricity supplied through a network system; the optimal tariff theory. He thereby presented another traditional but still fundamental critique, namely towards the use of average cost as a basis for tariffs (and investments), a principle which was referred to in the

¹⁰⁴ My translation

government report and which reflected the traditionally used practice within the general supply sector. Rather than average cost, he argued that the alternative cost principle should be applied as the pricing principle. In case such prices did not cover total costs, fixed prices for being connected to the system should rather be adjusted so that distortions of marginal cost elements could be avoided. This critique did not refer to the hierarchical program, but rather to the traditional cooperative program and practices. It provided strong arguments for micro-economic professionalism in pricing practices as well as in regulatory directives.

Implicitly, it also suggested a strong hierarchical “imitated market” program with a more substantial capability to direct local practices. This related basically to the electricity transmission and distribution networks, but also more generally towards all types of economic practices within the sector. In this sense, the market reform program which emerged, reserved a substantial role to economic professionals in designing tariff- and regulatory systems which would be necessary to secure the implementation of “proper” economic principles in sector practices.

Finally, Einar Hope focused on the market institutional systems and presented and extended the arguments that he had developed in the report to Statkraftverkene into a discussion of the need to establish new systems for trade with both electric power and risk, of the need to provide direct access by consumers to the market and the need for increased flexibility in pricing and contracting. He also repeated his critique outlined in the Statkraft-report, of the inappropriate incentives which followed from institutional arrangements within the sector. In addition to more flexible electricity markets, he argued for the establishing of markets for commodity futures for electricity trade where risks could be reallocated between actors seeking to hedge their risk exposures in the market. To this financial contract market also non-electricity companies could be invited. Hope also went on to argue that there was a substantial need to increase the economic competence of actors in the electricity market to make them more able to develop consistent economic strategies.

In his arguments, Hope now had become more explicit in his discussion of what could be achieved within the framework of the established system and which institutional changes would represent a more radical market reform. In his final comment he noted that:

“It should [...] be clear that there are constraints on what can be achieved through better market adjustments and distribution of risks in the occasional power market seen in isolation, without seeing it in conjunction with the remaining part of the electric power trade

system. Given that firm power represents 90% of the total power trade and given that there are numerous problems related to market adjustments within the firm power part of the system, the largest efficiency gains will all together be found within this part. The challenge lays in other words in finding measures and systems which can create improved efficiency, flexibility and better utilization of resources within the electric power trade system as a whole.”¹⁰⁵ (Berg, Hagen and Hope, 1986:63).

With these concluding remarks Hope and the NHH economists had presented a programmatic paper to the state central administration which demonstrated that they were prepared to work out the principles of a general market reform of the electricity system. Taken together, the report presented the basic theoretical perspectives and principles behind a market based system based on standard micro economics, contributions from electricity economics and Hope’s structure-conduct-performance approach. The report also presented the most important arguments from the economists against the practices of the established hierarchical and cooperative systems within the sector. It explicitly pointed at the need for a general reform and at some possible institutional ingredients in such a reform.

The presentation was done in a fairly popular scientific form, with no international references neither to the academic debate on electricity sector deregulation nor to other deregulatory processes. As such, the report presented arguments in the form of pure theoretical statements and pragmatic arguments without further attempts at adding power behind them in order to push for their realization in a political-administrative context.

At this point of time, the market alternative had been created as a scientific construct which was being pulled into the internal debate in the government and within the FD/OED.

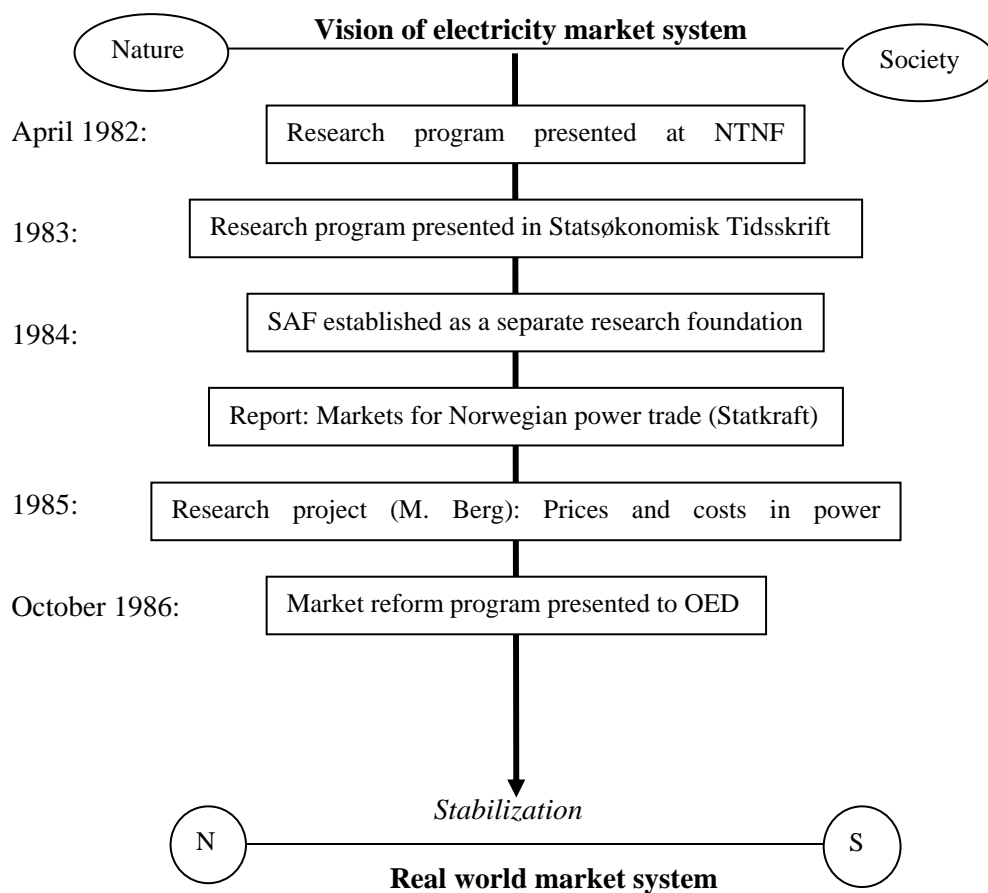
9.3 The gradual stabilization of an electricity market reform program

With these contributions, a market based system had been created as a laboratory construct with contributions from different disciplines at the SAF/NHH and with substantial professional authority mobilized behind it. The market reform program presented by Hagen, Berg and Hope in October 1986 can be seen as the termination of the first major part of the market

¹⁰⁵ My translation.

reform process; the first major milestone in its stabilization process - to use Latour's concept – as an outcome of a number of other initiatives and projects.

Figure 9.2. Stages towards a possible stabilization of an electricity market reform



By these successive and interrelated events, the market reform program became established as a circulating actor-network construct representing a semi-ontological market reform system. It had been developed from economic theory with a special emphasis on the structure-conduct-performance approach, from substantial empirical research and from early attempts at more limited and incremental improvements primarily within the occasional power market system. The theoretical framing pointed at both the establishing of a unified market system, at a re-configuration of the industry,

at a significant role for professional hierarchy and at the ambition to “re-shape” actors to behave according to the rationality assumptions of economic theory. This demanded that non-economic objectives be excluded from the framework of the actors’ decision making in order for them to calculate their “optimal economic choices”.

The emergence of the Norwegian electricity market reform program appears to have developed largely along a pathway separated from other electricity market reform approaches internationally, but well on the inside of the more general shift from state-hierarchical systems to markets in the late 1970s and early 1980s.

The presentation also points at the important role of the SAF research institution in the market reform collective – as the academic laboratory for market oriented research, education and scientific networking and as a network system which linked a variety of competencies together with state policy advice interests and necessary financial research funding.

The market reform program provided a conclusive answer to the early critique from the Hveding collective that there was no solid ground on which the SRMC argument could be applied. The presentation also demonstrates that to develop such an answer needed substantial empirical research, practical problem solving as well as entrepreneurship in combination with a more micro-oriented and multi-disciplinary approach capable of addressing the many different parts of the electricity system. As we shall see, there was numerous other aspects of the electricity system which had to be systematically addressed by the economists in order to produce an operational reform alternative with the necessary credibility to force a political breakthrough within the sector as well as within the political and state administrative system. Without the research program created by Einar Hope and without his ability to expand it into an in theory alternative through lots of networking and research, Norway would obviously not have embarked on a market reform – at least not at an early stage.

10 Tormod Hermansen, the social democratic modernization program and the links to the electricity market reform collective at SAF

Finally, the fourth leg of the animal shall be presented. Now, the attention will be directed towards the state, towards the rivalry between the market oriented political parties and a social democratic party struggling to regain the initiative during the late 1980s, and towards the network of actors and commanding heights which came to play major roles in the further market reform process.

In these processes, Tormod Hermansen appears to have played a role in them all – usually in a key networking position. He accordingly provides a promising point of entrance for investigations into how the social democratic party's strive for modernization came to shape important conditions for the electricity sector reform approach, as well as into how the scientific program at the SAF became transformed into a radical, operational political reform project through various networking activities.

What were the major differences between the neo-liberal program which emerged from economics and became supported by the right wing political parties, and the social democratic modernization program? What implications did the new program have for the structuring of the market reform? What was the role of Tormod Hermansen in the shaping of it, and which scientific schools of thought came to influence the new approach? From this focus on the shaping of the political regime which hold power during the period in which the electricity market reform process became pushed – between 1986 and 1989, I shall narrow down on the relationship between the Ministry of Finance where Hermansen in 1986 had become the head of administration, and the economists at NHH. The purpose is both to outline some of the networks within the state administration which mobilized for the market reform alternative, and their relations to NHH economists and the electricity market reform project. What was the role of the electricity market reform research program at SAF in this broader state-science network?

My core argument is that the electricity market reform became mobilized as the major representation of an ambitious economic reform program outlined jointly by NHH economists and the Ministry of Finance through 1986-87. The report from Berg, Hagen and Hope in 1986 served a particularly important role in this program, which represented a major breakthrough for the NHH economists into the FD administration at the expense to the traditional FD-UiO relationship – invited and mediated by Hermansen. It

was this joint FD-NHH network of actors with their state institutional powers and scientific capabilities and authority which mobilized the electricity market alternative to fill the open space within the electricity sector; a fairly wide spread acknowledgment of the need for some kind of reform to improve economic efficiency and organizational rationality.

10.1 Tormod Hermansen and the social democratic modernization program

Tormod Hermansen in 1986 became appointed head of administration¹⁰⁶ in the FD after Eivind Erichsen's retirement. Hermansen was a member of AP, but was appointed by the coalition government and its conservative Minister of Finance, Arne Skauge. The background for this event was apparently that Hermansen since 1981, during a period where the conservative and the coalition governments pushed for new public management reforms, had shown himself as an effective leader of public sector reform processes within the Ministry of Labor and Municipal Affairs, where he also served as head of administration¹⁰⁷.

From his new position in the FD, he in August 1987 initiated a further shift in economic orientation facilitated through a restructuring process within the FD. In his view, and despite the credit market reform, the FD was still dominated by a macro-stabilization oriented Keynesian tradition which prevented initiatives for micro-economic transformation of economic sectors and thereby an efficient market economy, growth and international competitiveness. During the initial process within FD, he suggested to reduce the number of departments from 11 to 4. Seven heads of department were accordingly forced to find other positions outside the ministry (Barth Jacobsen, 1998: 122). Through negotiations, the final number was set to 8, but through the very restructuring process, Hermansen had been able to put together a new team which radically reduced the remaining influences of the traditional Oslo School of Economics within the FD, and which shifted associations closer to the NHH economists in Bergen (Barth Jacobsen, 1998:157).

Tormod Hermansen had been educated as an economist at the UiO under "the regime" of Trygve Haavelmo and Leif Johansen. In the late 1960s, he

¹⁰⁶ Finansråd

¹⁰⁷ Departementsråd i kommunal- og arbeidsdepartementet 1980 - 1986

worked at the EFTA secretariat in Geneva, where the Norwegian delegation was headed by Per Kleppe. One source which is said to have influenced Hermansen during this period, was Ota Sik, the minister for planning in Alexander Dubcek's pre-1968 government. Sik was an important ideologist behind the reform initiative in Tchechoslovakia, who argued for a market based system within the frameworks of a socialist state. A condition for such a system to produce an efficient economy, was to eradicate negative aspects of and features of management through dedicated interventions¹⁰⁸. These ideas represented a new concept; the transformation of Oskar Lange's central planning system into Hayek and von Mises market theories and philosophy, with a close attention to the role of leadership in a system with public property rights and thereby constraints on assumed individual economic incentives.

From 1969, Tormod Hermansen worked at the district collage in Kristiansand as a teacher in micro-economics. In 1972 he came to the University of Bergen (UiB) as a lecturer, where he also came to work with Einar Hope at NHH/SAF on Hope's large empirical industrial organization research project. He wrote a few chapters in research publications edited by Hope which was primarily intended to be educational literature for students. No doubt, Hope's empirical orientation, industrial organization theoretical approach and search for practical improvements in sector economies fitted rather well to the ideas represented by Ota Sik and to Hermansen's own interest in competitive markets – as seen from a state governance perspective.

In 1977 he was appointed head of one of the departments in the Ministry for social affairs¹⁰⁹, but was soon brought to the FD as a "vise-minister"¹¹⁰ for Minister of Finance Per Kleppe in the AP government. As I have already noted, he there came in a key "junior" position during the credit market reform and its dramatic shift from the Oslo School of Economics to the monetaristic Chicago School approach of the NB economists. With his background relationship both to Per Kleppe and the NHH economists, it appears that Hermansen became a fairly influential spokesman for the new approach of the NB economists, and that he learned an early lesson on how a radical market reform could be created from economic research and turned

¹⁰⁸ Barth Jacobsen, 1998: 114

¹⁰⁹ Ekspedisjonssjef i sosialavdelingen, (Norges Statskalender, 1980)

¹¹⁰ Statssekretær

into a large scale remaking of society process through a lot of dedicated networking as described in chapter 7. He also experienced the build up of the new oil sector, the establishing of Statoil as a main political instrument for state oil- and gas policy and the build up of the state governance and income systems in the new oil- and gas sector, which came to represent in important comparative standard for financial contributions from the electricity sector to state budgets.

In the following, I will follow Tormod Hermansen through some of the projects he became involved with which came to both represent important shifts in Norwegian economic policy and important commanding heights for the electricity market reform. The two most influential projects in our perspective, were probably the Hermansen Committee and the Steigum Committee. Together, these committees presented the foundation for what was to become an early Norwegian parallel to Anthony Giddens' and Tony Blairs new social democratic "Third Way" policy in England in the late 1990's, which could perhaps be subscribed under the label: "More markets – more governance" – to take over from the neo-liberal: "More markets – less state".

10.1.1 "More markets – more governance"

The shift in government in May 1986 brought the AP back to power with a new Gro Harlem Brundtland government, and with it, an ambition to modernize a traditional social democratic policy which had been pushed back by the neo-liberal and new public management programs in the wake of the economic crisis in the late 1970s. The government initiated efforts at constructing a "renewal" program for the party which aimed at reinforcing the welfare state concept based on a reinterpretation of the role of both state and markets in the economy. The approach was to include a modified but professionally viable economic neo-liberal program and thereby to tune down the traditional hierarchical ideology, and partly to include and modify the new public management program into a new organizational policy for the state and the public sector at large.

On the other hand, it also included a close income-political cooperation with the trade unions which forced a partial breakdown for new public management aspirations to privatize public services and labor market deregulation initiatives like increasing wages to public sector top management. A new "solidarity alternative" concept demanded that those with the lower incomes should rather receive the wage increases. The labor market and the trade unions accordingly came to represent an important defense-line for traditional social democratic policies which maintained an

internal balance within the party between the traditionalists and the new generation of “modernizers”.

Public sector reforms were seen by the government as obviously needed in order to produce a stronger defense for collective political organization against privatization and in order to regain the political initiative by the AP. This view represented a radical rejection of the neo-liberal view of the state associated with the Reagan- and Thatcher administrations in the US and the UK as well as an obvious fundamental approval of the neo-liberal view of the efficiency of markets. In order to be defended, the welfare state had to be modernized through market oriented reforms (exclusive the labor market). The renewal program can be seen as an effort to integrate the traditional social democratic ideology and its labor union power basis with the neo-liberal and new public management programs. This resulted in a more complex governance program with a specifically social democratic “more governance” oriented role of the state and a flexible, multi-optional approach to public sector organization and state regulation and control systems. One could also say that rather than the traditional and ideologically infused quantitative distinction between states and markets represented by the neo-liberal program and the traditional socialists, the ambition became one of focusing on the qualitative dimensions of the state-market relationship and on the variety of governance tools and organizational forms available for the improvement of micro-, meso- and macro economic order and efficiency within the frameworks of a social democratic welfare state concept. This was the large scale political-economic program in which Tormod Hermansen came to play an important role.

The ambition of the government to get Norway into the European Union and to prepare the Norwegian economy for the competitive European market, was of course an important point of reference for this new policy – an argument which was used to persuade traditionalists and trade unions about the necessity of economic and organizational reforms.

Where as the AP party organization had dominated the party’s policy formulations during the 1970’s and during the opposition period from 1981 to 1986, the ambition to incorporate modern economic, political and organizational theory pointed at a reform strategy dominated by social scientists directly organized by the party leadership/government. Through its networking with various scientific professionals, often structured into various government policy committees, the new program became shaped in between 1986 and 1988/89. Young economists like Ted Hanisch, Eldrid

Nordbø¹¹¹, Torstein Moland and Bjørn Skogstad Aamo had entered the prime minister's office and the FD and thereby "sealed off" influences from the post-war traditionalist generation (Barth Jacobsen, 1998:154). In the FD, Tormod Hermansen in coordination with Minister of Finance and AP vice-leader Gunnar Berge played important roles in the construction of a new economic program. The government also invited another area of social science; which we might denote "the neo-institutional political and organizational theory research program" to participate in the policy-making process.

The association between the neo-institutional political and organizational theorists and the program for renewal of the AP program, was based on their understanding of the role of the state in the economy and the role and character of politics and public sector administration as a highly complex phenomenon, in contrast to the simplistic market versus state dichotomy of the economists. In its search for ways to redefine the role of the state and to modify and "social democratize" the market-liberal and the new public management programs, the political and organizational scientists offered a large bulk of relevant empirical research and theoretical concepts as well as substantial national and international scientific authority. Professor Johan P. Olsen in particular, came to represent this area of science and became an important participant in formulating the integrative new program. He was involved with the LOS Research Center which was a center for social scientists at University in Bergen (UiB), NHH and UiO who had public sector organization and governance as its primary domain. It had gained attention and momentum through out the 1980's, largely in opposition to the simplistic beliefs in the "magic" of the market represented by the expansionary economists. It was also part of a strong Scandinavian scientific research program with strong links to the US – in particular to Harvard University and to Stanford University, where James G. March had been a substantial contributor to the program, not at least through his close cooperation with Johan P. Olsen.

10.1.2 The rivalry between the market-liberal and the modernized social democratic programs

The concepts of the social democratic "more markets – more governance" renewal program can be traced in other policy oriented reports presented by the AP-government as contrasted with the "more markets – less state"

¹¹¹ Eldrid Nordbø from 1981 to 1986 served as head of department in the Ministry for labour and municipal affairs when T. Hermansen served as its head of administration (Norges Statskalender).

orientation of the “think thank committees” of the coalition governments. In between 1986 and 1991, four different government reports reflected this “ideological” battle between the by now “classical” neo-liberal and the transformed social democratic renewal programs. Of these, the first and the last report were initiated by two different coalition governments and the two intermediates by the Brundtland AP-government.

The first report was presented by the coalition government in April 1986 and was called “*Program for modernization of the state administration*”. It represented an extension of the 1981-83 conservative government’s ambition to “simplify” public administration, to push for market- and service-oriented new public management initiatives and deregulation, and also reflected the government’s long term financial program for 1986-89¹¹². The program reflected a continuous strong commitment to create a more efficient public sector – primarily through increased exposures to market competition in markets for public services as well as in the labor market. To a larger extent public sector entities should have to compete directly with privately organized alternatives in order to demonstrate their economic efficiency, and public sector managers should have to compete for their jobs in similar ways as private sector leaders. A moderate operational program for privatization of public services and efforts to reduce the rigidities of public sector wage setting were accordingly included in order to get this competition off the ground.

Privatization of public services and a shift away from detailed regulations to a more clear cut separation into autonomous operational business oriented entities on the one hand, and a politically oriented central administration/economic regulator on the other, represented the main direction. Specialized modernizing programs for the ministries were also announced in order to strengthen their flexibility and usability as political instruments and workshops to the government. A major argument here was to secure a sufficiently large distance and independence between the state political institutions and organized economic interests (Helgesen, 1991). That is, a deconstruction of the post-war corporate governance structures which linked sector cooperative systems closely to the state administration and which had actually delegated traditional state authorities to sector cooperative organizations in many sectors of the economy.

In May 1987, one year after it gained power, the Brundtland government presented its “*Renewal Program: The New State*”, which was partly an

¹¹² St. meld. nr. 83, 1984/85

extension of the modernization of the state administration program presented by the coalition government. The new program however, deviated in important respects and in particular on the role of privatization and the role of state control in the economy. In short; it rejected the neo-liberal role of the state. It reflected the ambition to modernize, protect and further develop the welfare state within the frameworks of public property rights control. Privatization was rejected as a wanted approach but, the report stressed the necessity to improve the provision of public services if unwanted privatizations were to be avoided. The government accordingly supported a much more flexible organization of public administration and public production activities with more freedom and more economic responsibility to operational entities – with more business-like organizational forms.

The further development of these ideas can be traced in the third government report presented by the Hermansen-committee in March 1989; the NOU 1989:5: “*A better organized state*”, which focussed on public sector organizational issues. The committee had been established in January 1987 and was headed by Tormod Hermansen. Its core professional member was Professor Johan P. Olsen. Contrary to the focus on market reorientation represented by the two previous programs, the new report focused on the complexity involved in the roles of the modern state and on the multi-functional character of public sector administration. It thereby attacked the simplified core of the new public management program; the assumption that business organizational models were fundamentally relevant to all kinds of public sector organizational purposes.

The committee analyzed around 300 different public sector organizations in their search for useful models and concepts in relations to various organizational fields and purposes. Different forms of organizational and structural arrangements were presented and discussed and largely found to be appropriate in different situations. Rather than arguing for a few particular institutional-organizational structures and forms, the report outlined a broad set of alternatives and pointed at mediating forms and flexible approaches which could make it possible to increase efficiency and maintain or increase political, economic and administrative governance and control simultaneously. The choice of organizational form should accordingly depend on the specific purpose and character of the tasks of each particular entity, and could take different forms, for instance in between the traditionally organized public bureau for civil service administration tasks to business organized publicly owned joint stock companies for goods- or service-producing entities - or outright privatization.

The report presented important guidelines for the social democratic modernization approach and for the intermediate organizational forms like

“state company” or “municipal company” forms which were designed as judicial forms in between the traditional public bureau and the commercial joint stock company. It also came to outline the major direction of as well as the essential constraints on the electricity market reform: State control and public property rights within the electricity sector should be closely guarded.

Already in 1985, we have seen that the “state company” judicial form had emerged as a compromise form in between the coalition government and the AP/trade union traditionalists during the organizational reform of NVE/Statskraftverkene. The electricity market reform - from the perspective of the “better organized state” – could be seen as a selected, specific and particularly suitable approach to a production oriented sector reform – in order to demonstrate the new social democratic renewal model. As we will see however, the electricity sector reform process emerged politically before a new social democratic consensus had been achieved. In the meantime the traditional public sector hierarchical program within the party mobilized for the hierarchical restructuring program associated with the Vinjar-Vatten-Diesen collective and with AP government policies back to 1960 – to challenge the market oriented “modernizers” within the party.

The fourth and final report presented on the topic of public sector reforms, was worked out by the “Normann-committee” which had a strong representation of NHH economists. It had been appointed by the Ministry of Work and Administration under the new Syse-coalition government in August 1990, but presented its report first by April 1991 after a another Brundtland government had once again taken over. The committee, headed by Professor in Economics at NHH, Victor Normann, represented a deliberate effort to regain the initiative for a more classical economic market liberal and new public management program by stressing the economic efficiency arguments of the general market equilibrium theory, and by following a strategy of calculating the potential welfare gains from a number of radical deregulation and privatization projects through out the economy. The work of the committee in this sense reflected the entire economic research program through out the 1980s at the NHH - including the electricity market program.

The report however, met opposition from public sector interests and trade unions, and from the neo-institutional political and organizational theorists, who presented a flow of arguments against the “one-sided” economic approach. The impression of overwhelming potentially radical changes in a multiplicity of economic sectors appeared to have met the same destiny as the first national plan for the electricity sector: It was too ambitious, provoked too much resistance and thereby undermined its initial fairly strong political support. It was too much at a time. The report in the end received no

support from the Brundtland AP-government, and was not used as a background report for further political initiatives (Helgesen, 1991). Rather, it came to represent a relative breakdown of the ambitious market liberal program within the central state administration – and a return to a policy of consolidation.

The combination of the on-going financial crisis in the deregulated commercial banking sector, the political and scientific reactions to the Normann-committee and the return to another social democratic government in 1990 which in parliament was dependent on the agrarian Senterpartiet under its new leader Anne Enger Lahnstein, can largely be seen as ending the period of expanding economic neo-liberal and new public management programs initiated at the state-administrative level in Norway. In 1991, Tormod Hermansen also left his “commanding height” in the FD and moved to the state telecom company Telenor, where he embarked on a modernization of the state company and the telecom sector – as part of Norwegian preparations for the international deregulation of the telecom sector from January 1st 1998. The state administration thereby also seems to have lost one of its important driving forces for further economic deregulation.

As a confirmation of this impression, the AP-government in its parliamentary report, St. meld. nr. 35, 1991/1992, stated its fundamental support for the established institutional-organizational systems in the state administration and rejected the need for further radical restructuring processes, neither in terms of organizational sizes, redistribution of roles nor introduction of new governance tools (p. 5). In close accordance with the attitude of the institutionalists, the government underlined its understanding of public administration as one of complexity and multiplicity of roles aimed at the maintenance of multiple values, goals and aspects (p. 32). This apparently forced back the market liberal program; more markets - less state, and undermined its capacity to remake society through further large scale breakthroughs into new sectors of the economy. And, it turned the emphasis towards more technical reforms at more detailed levels of sector economic regulations – within the frameworks of the new regimes which had been created through the 1980s. “More markets – less state” had become “more markets – more governance”.

10.1.3 The Steigum committee and the new economic program

The more specific concern with a possible electricity market reform emerged in relation to another important committee which had a more economically defined focus. In October 1986, the AP government established a committee within the FD under the leadership of Gunnar Berge and Tormod

Hermansen. It became headed by NHH professor in economics Erling Steigum jr., and received the mandate to prepare for the government's long term economic program. In other words: the government's economic "think tank". Another of its members was the FD economist Sigurd Tveitereid, who had taken over responsibility for energy affairs within the FD. The committee worked out numerous ideas on a new economic policy which aimed at transforming the social democratic policy into a policy which reflected the new developments in international scientific and political economics. In Hermansen's words:

*"In many ways I think that what I did was to catch an international efficiency-trend – another approach to state activities with different governance philosophies – among others what Thatcher did in England. These were new approaches. We were curious and concerned with avoiding that Norway in any way lagged behind"*¹¹³.

The report from the Steigum-committee became presented in 1988 and was called "Norwegian economy in transformation" (NOU 1988:21)¹¹⁴. It outlined the political aspirations and perspectives of the now much more micro-economic and demand side management oriented Ministry of Finance in alliance with NHH economists. Through out 1986 and 1987 the committee served as a creative "think tank" within the FD into which the 1986 report from Kåre P. Hagen, Morten Berg and Einar Hope to OED was included. Both the role of Steigum as a representative of the NHH economists and Hermansen's personal knowledge of and respect for Einar Hope, ensured that the Hagen-Berg-Hope report was turned into focus as the most ambitious reform proposal presented by the committee.

Not only the credit market, but the entire economic policy had now shifted from the traditional Oslo School of Economics to the general equilibrium approach. The Steigum report argued strongly to break off from a policy which focused on the allocation of resources to and within specific sectors and for turning to a policy which stimulated demand side interests in the governance system in general. It argued for general market oriented changes in order to improve resource allocation efficiency in broad terms. Hence, emphasis should be given to strengthen competition and flexible pricing in general. In particular the markets for capital, labor and energy had to be

¹¹³ Bjørn Barth Jacobsen interview with Tormod Hermansen. My translation (Barth Jacobsen, 1998:158)

¹¹⁴ Norsk økonomi i forandring (my translation)

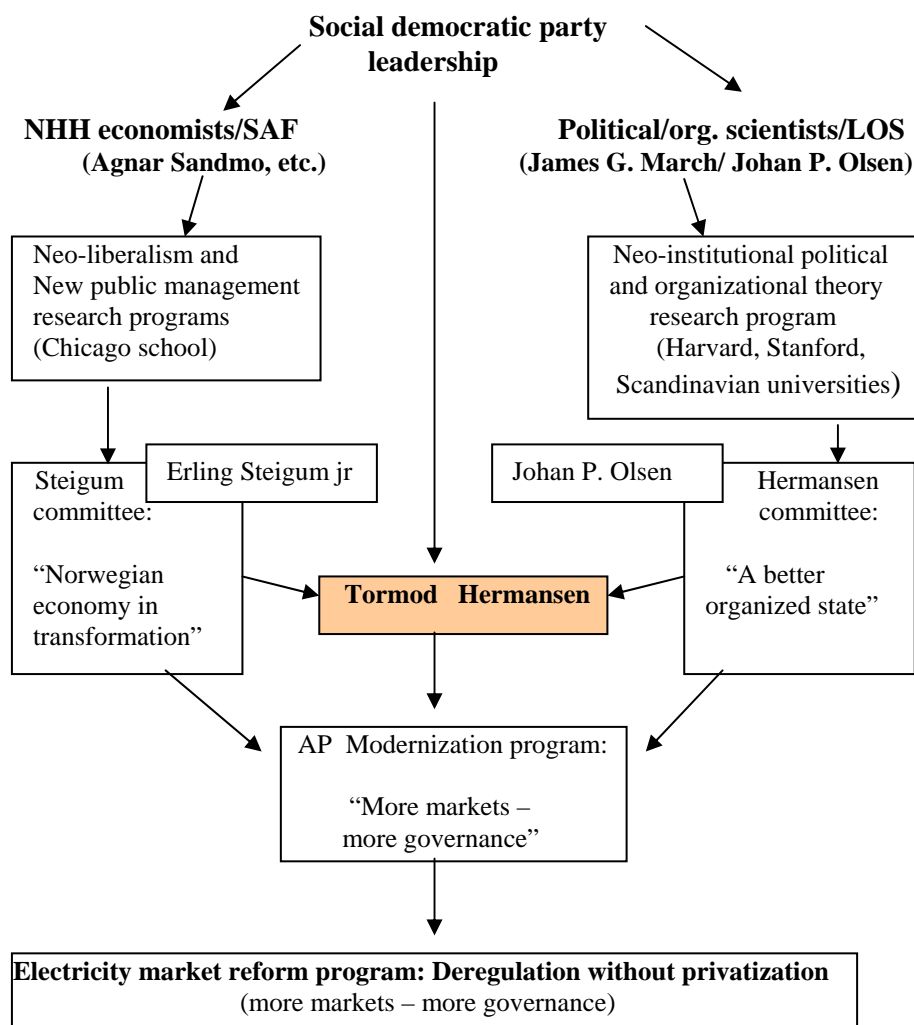
developed, where as specific policies to support local employment and district communities should be abandoned.

Given the obvious political constraints on any labor market reforms under a social democratic government, energy turned to the focus. A national market for electricity was taken up specifically, and the report argued that a unified national market for electricity with similar prices for all buyers should be established. The established divided power market was said to lead to great variations in pricing, implicit subsidies and other delivery conditions which implied inefficient resource allocations (NOU, 1988:21:18).

The advocacy for a general electricity market reform in the report shows that the electricity market reform had reached a consensus within the FD through the “educational” activity of the Steigum Committee, and was advocated actively during 1988 as a reform in line with the deregulation of the capital market. It also indicates that the reform initiative by 1988 was supported by the AP government – as part of its new long term economic program.

Below, in figure 10.1., I have outlined the networking activities which came to shape the state engagement in the electricity market reform. It came to materialize something pretty close to the early ideas of Ota Sik; a flexible market oriented system within a strong state governance control and public property rights regime: “More markets – more governance”.

Figure 10.1. The shaping of the “more markets – more governance” electricity market reform program



One important role of Tormod Hermansen was his “linking” of the neo-liberal electricity market reform with the social democratic program for the modernized welfare state, the linking of markets with an ambitious state.

With the presentation of the Steigum report, attention moved towards practical electricity market reform initiatives. This was a job to be governed and coordinated by Hermansen and Tveitereid¹¹⁵.

10.2 The “Hermansen electricity market reform collective”

From the point of view of the FD, an electricity market reform would have to rest on scientific contributions from Hagen, Berg and Hope/SAF. But it also had to be administratively anchored within the OED. The latter point was of course a challenge which had to be carefully solved. The solution found was to separate the department within the OED which was responsible for the electricity market - the market department - into one petroleum market department and one energy department. Next, Arne Øien asked Tveitereid to take the idle job as head of the new energy department¹¹⁶. However, this arrangement did take some time and Tveitereid could not take over the new job before December 1988. In the meantime, Hermansen moved on to initiate a specific market reform research project with Einar Hope at SAF, which was formally established in August 1988. To participate in the coordination of the project between the SAF and the FD, the young FD economist Eivind Tandberg was sent to work with Hope on the project¹¹⁷. In the FD, deputy director Arild Sundberg became responsible for the project. Together with Tveitereid, one representative from OED and one from NVE, Sundberg also became a member of the governance committee for the research project.

Through the work of the Steigum-committee and through these networking activities, what we may call the Hermansen electricity reform actor-network became established. It was both an interpersonal network, a network between organizational entities and an institutional network of legislative, rule based and contract based relations. We may also see it as part of a political-administrative network with relations to political parties and scientific communities more broadly, but here, I will concentrate on the more narrow core.

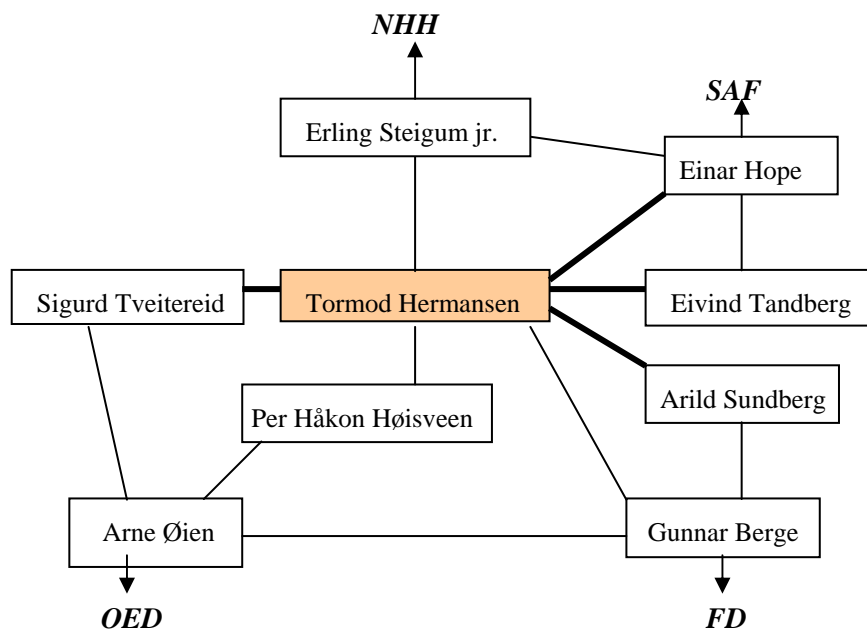
¹¹⁵ The new competition law can probably also be seen as initiated through the work of the Steigum committee.

¹¹⁶ Bjørn Barth Jacobsen, 1998: 157, interview with Arne Øien.

¹¹⁷ Tandberg was permitted to do his “social service” instead of military service as a research assistant at SAF.

Below, I have illustrated the inter-personal and the institutional networks of the Hermansen market reform actor-network. It is important to note that each node in the network represents an actor as well as a network where each hold a capacity to change the relationship and thereby transform the network.

Figure 10.2. The Hermansen interpersonal electricity market reform network

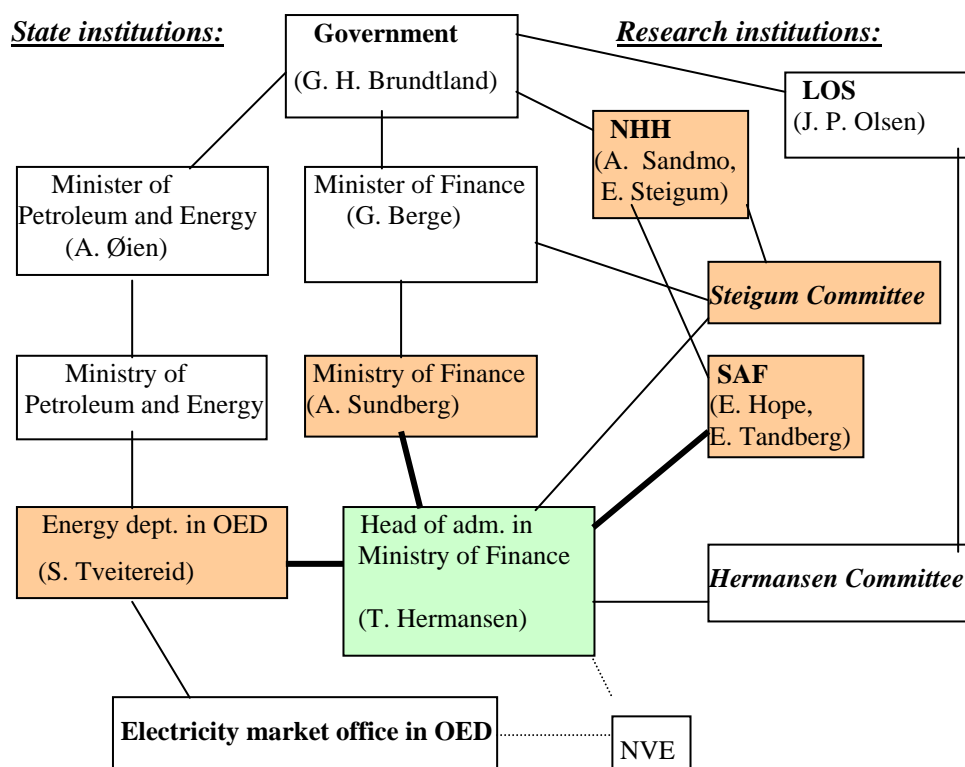


Bold arrows indicate the core relationships within the network.

Per Håkon Høisveen was a deputy director within the OED, who had been working with Erling Diesen within the Energy Law Commission on the hierarchical restructuring approach. He was asked to participate in the governance committee for the SAF project as a representative from OED and as a linkage to the ongoing legislative reform process.

In figure 10.3, I have indicated the institutional relationships associated with the interpersonal Hermansen state-administrative actor-network.

Figure 10.3. The Hermansen “institutional” electricity market reform network



The shaded boxes represent the core institutional elements in the operational reform project.

The core of the network contained the Ministry of Finance, the Energy department within the Ministry of Petroleum and Energy, the Steigum Committee and the NHH-SAF. The NVE was largely outside the network at the early stage, but was invited to participate in the governance committee of the SAF research project. Department director Svein Storstein Pedersen came to represent the NVE in the project.

The reorganizing within the OED which placed Sigurd Tveitereid in the position as head of department for the energy department, adds to the impression that the government was supportive to the idea to push for Einar Hope’s market reform alternative. We also note that the hydropower department within the OED, which represented much of the judicial expertise on the electricity system, was not part of the market reform

network. The department was headed by cand. juris. Hans-Ludvig Dehlin, who followed the sector from the Ministry for Industry to the new OED in 1978.

10.3 The roles of the state and of entrepreneurial collectives within the state administration in the creation of new market systems

The role of the state in some industrial economic system is a crucial one. It may take a variety of forms, each providing different sets of roles and rules of the game and distributions of powers and economic gains between state institutions and their civil society counterparts in anyone particular sector of society. The state is accordingly an object for intense rivalries between different collectives of actors which can be characterized by their different purposes and programs – be they represented by political parties or other kinds of collective systems and interests. The case presented demonstrates this interplay between civil society entrepreneurial collectives and actor-networks within the state political-administrative system. It shows that the ability to mobilize the adequate networks of actors behind a radical large scale economic reform initiative is crucially dependent on the congruency between the civil society entrepreneurial collective and some powerful state counterparts. It has also pointed at the significance of the capturing of the relevant commanding heights - or even the creation of new ones - if an entrepreneurial collective of the type we discuss here shall succeed in expanding and stabilizing its program in society. By moving its delegates into important institutional positions, these institutions become enrolled into the entrepreneurial collective and thereby become capable of taking on responsibilities on behalf of it. Without such counterparts – such a thing as an academic research program is unlikely to be turned into a stabilized real life economic system.

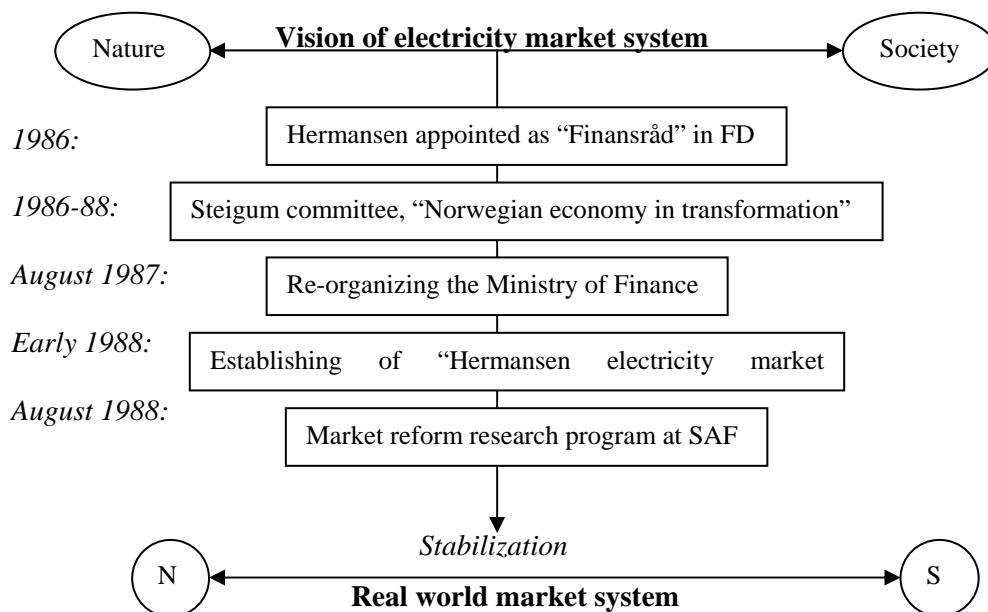
To create this congruency in part depends upon various networking activities which obviously involves the government and its relevant ministers, and which has to do with the “capturing and reshaping” of the relevant commanding heights within the administration. In part it also has to do with timing and concordance between the civil society entrepreneurial collective and major formative movements at an international level – which provide necessary legitimacy and political support for the local change program.

The expansion of the market reform collective into the state administration and thereby its transformation from a research program into a political-administrative program, occurred in part as a consequence of the appointing

of Tormod Hermansen to a leading administrative position within the FD in 1986. As such, we may infer that the linking had some elements of pure chance. But from that event, the linking of NHH with the FD was part of a deliberate program to reshape the Norwegian economy as well as public sector administration, and the availability of a highly developed research program which concerned a radical market reform of one of the most significant sectors of the economy, offered a perfect opportunity to advance the broader change program. The electricity market reform program accordingly expanded on the basis of mutual initiatives from both economists and entrepreneurial collectives within the state. It is hard to find any evidence that actors and economic interests from within the electricity sector itself intervened or played any significant role in the process at this early stage.

The report from the Steigum committee as well as the establishing of an operative electricity market reform collective within the state administration and the initiation of another research project at the SAF, represent additional steps towards the stabilization of a real world electricity market system – however still at a substantial distance from the final goal.

Figure 10.4. Political-administrative elements in the stabilization of an electricity market reform program



We have also seen that the specific form of the electricity market reform, as an economic deregulation without privatization, was deeply rooted in the social democratic rejection of the neo-liberal role of the state – in its defense for a view on the role of the state which had deep roots in Norway back to the early days of Gunnar Knudsen, to the concession law system for national resource control and the post war social democratic welfare state. It also became linked up with a scientific program which hold a detailed and complex understanding of the role of the state in modern societies. The joining of the neo-liberal with this more complex view of the state, came to represent an early breakthrough in Norway for something which was to become known as a social democratic “third way” program most prominently advocated and spelled out by Anthony Giddens and Tony Blair in England later in the 1990s.

10.4 Triangulating the sources of the electricity market reform collective

I have now outlined a picture of the roots of and the various pathways of developments which came to shape the establishing of an early entrepreneurial electricity market reform collective in between the SAF and the FD/OED. There may have been other pathways with significant influences that I have not presented – that I might not even be aware of. To explore these might be a challenge to historians. My primary concern here however, has been to investigate these matters from the theoretical proposition that economics as a scientific discipline plays a significant role in processes of re-framing, re-configuring and re-formatting of economies. At this point of the analysis, I think we may conclude that at least in this case, economics as theory and as a scientific community played an essential role in the shaping of what was to become a large scale reform process. It also played an essential role in the shaping of a political-administrative program which provided access to positions from where the new electricity market program could be pushed towards a re-configuration of the industry.

The presentation has indicated that alternative change programs lost much of their powers or where unable to mobilize sufficient powers to create convincing political breakthroughs in the 1970s and early 1980s. This followed at least in part because of their lack of support from any substantial professional economic community. The various “unsuccessful” programs – which all aimed at improving economic efficiency and rationality within the sector in some way or another – left a space open for other alternatives in terms of relatively limited legitimacy and authority behind the existing system. Strong historical lock-ins represented by two different rival concepts; the local-cooperative and the state-hierarchical, made this a highly

challenging task to any type of approach. It remains to be seen how the market reform collective were able to cope with these challenges in order to create sufficient support to create a significant political breakthrough in parliament as well as within the electricity sector.

The program which gradually became constructed at the SAF, emerged from a specific interest in the functioning of the occasional power market, and from efforts at expanding its ability to cope with specific economic problems within the sector – such as the substantial variation in precipitation from year to year and the lack of appropriate systems for individual electricity companies to cope with financial risks. By giving the occasional power market a very different role than what it had been given by Vidkun Hveding, Hope around 1982 re-framed the system in such a way as to provide a possible operational alternative consistent with the early insistence by economists on a SRMC based pricing system within the entire electricity system. Piece by piece essential elements of such a system became collected and aligned through various research projects and scientific networking activities.

We may also note that the most important roles in Hope's program in part were given to economic experts as the designers of appropriate price systems and economic governance and control systems (through the role of "the state regulator"), and in part to electricity company owners and managers as local decision-makers. There was no substantial concern with technological system design – as whatever investment problem had become transformed to a pricing and financial return problem – market based or imposed by experts representing the state regulator. Technological choices had become disentangled and externalized from the economic governance system.

These developments occurred as the credit market reform and a broad political, ideological and educational movement had transformed the environment of these events. When Tormod Hermansen took over his new job in the Ministry of Finance, the credit market reform as well as a number of new public management reforms in which he had been involved in many, had been completed, and substantial experience and learning had been gained which now could be collected behind another large scale economic reform. These early events and broad social changes were in essence what provided the electricity market approach with a substantial capacity to "capture and reshape" important commanding heights – in addition to a powerful advocacy from the entire NHH economics community.

Part IV:

Transforming the electricity industry

Introduction

In this final part of the analysis the aim is to explain the radical transformation of the electricity sector and the apparently successful stabilization of a competitive market system through the 1990s. What I will do, is to follow this process of transformation from the research project at SAF initiated by Hermansen and Tveitereid through the political-administrative networking and rivalry with an alternative reform proposal, to the legislative breakthrough for the market reform in parliament. From this decisive event I will investigate in short a variety of change projects initiated by the market reform collective which aimed at a broad and rapid re-configuration of the industry.

The ambition is first and foremost to explain why the reform became so effective in its reshaping of an industry characterized by powerful historical lock-ins. From the theory of entrepreneurial collectives outlined, there are two major analytical contributions to such an analysis. One is the dynamic concept of power which suggests that some entrepreneurial collective has been able to aggregate sufficient powers to force major actors (actor-networks/actants) on the “outside” of the collective to get on the “inside”. The other is the concept of simplification of one actor-network by another, which demands a relative congruency between the roles given to specific actors and their own understanding about their roles within their own rules and roles of the game models. Without such a congruency, enrolled members are unlikely to behave in predictable ways – as seen from the acting entrepreneurial collective’s point of view.

On the one hand, this turns the focus of attention towards the collected and constructed elements which made up the aggregated chain of durable powers associated with the market reform program. What were the main ingredients in this power system? On the other hand, it draws the attention towards the relationship between the specifics of the program – the actual juxtaposition of its core simplified elements and its surrounding rules and roles of the game model – and the programs of important rival networks of actors within or related to the electricity sector – like Hveding’s system design program, the hierarchical restructuring program, the local cooperatives and the large scale power intensive industry program. How did these relate to the new market approach? Were they opponents or were the roles given to them acceptable as seen from their own perspectives?

A third focus of attention will be on the actual process of change from the perspective of the strategy of the market reform. Can it be said to have been a rationalistically planned and implemented economic reform, or was it

rather an incremental process characterized by sequential planning, partial implementation and successive problem solving, strategic rivalry, chance events, political networking and stepwise transformation of the industrial environment by the expanding entrepreneurial collective?

Finally, the ambition is to demonstrate the crucial and very powerful roles of economics in reshaping of industry processes. The core argument is that contributions from within economics provided the market reform collective with both a powerful support and a very rich source of conceptually consistent solutions – or models – which could be applied to the many different operational problems which had to be sorted out along the way. Through the linking of Einar Hope's empirical research with a network of economists at SAF/NHH with access to a broad set of highly specialized scientific literature, the capacity for problem solving and system innovation became quite impressive. Furthermore, through the implementation of new systems which were derived from economic theory, cognitive-, organizational- and behavioral structures through out the sector gradually became transformed so as to become consistent with fundamental theoretical assumptions and propositions within economics.

Part IV contains the following three chapters:

Chapter 11:

Constructing a market; its scientific representation and its relations to established collectives

Chapter 12:

Hierarchical restructuring or market reform? The decisive breakthrough

Chapter 13:

Shaping and stabilizing a market system and its economic agencies

This rounds up the analysis before the summary and final conclusions which will be presented in chapter 14.

11 Constructing a market; its scientific representation and its relations to established collectives

We shall now turn to the actual construction of a market reform alternative at the SAF which later became handed over to the political-administrative decision process. The focus of attention is the SAF report “*Market based power exchange in Norway*” which outlined a market based system as an operational alternative. To get a picture of its core elements, I will provide an overview of the content of the main report as well as a brief overview of the many sub-reports which discussed a variety of issues in substantial more detail. I will then present a couple of issues which became sources of dispute within the economics community – notably between the economists at NHH/SAF and some of their colleagues at UiO. Finally, I will speculate a little over the relationship between the program outlined and those of its major historical rivals. This will in turn serve as a point of reference for the next two chapters.

11.1 Producing a representation of a market based system: the electricity market report

The first major step by Hermansen and Tveitereid was to initiate an outline of an operational reform alternative with sufficient scientific authority behind it to be able to mobilize for a political-legislative breakthrough. One had to create a convincing representation of the system by which to demonstrate both efficiency advantages and practical and organizational solutions. Due to the close interaction between the FD and the NHH economists - actually working on a joint project - much of the work could be delegated from FD/OED on a basis of trust. The simple thing to be done was to ask Einar Hope at the SAF and his colleagues to work out the theoretical principles and arguments and to come up with a practical reform proposal - on the single condition that property rights should not be touched. The task – from the point of view of the SAF - was accordingly fairly open, but nevertheless contained quite a few implicit demands. First, the SAF needed to come up with a convincing representation of the market system both in theoretical and in practical terms. Second, scientific authority and legitimacy needed to be mobilized behind it, which implied that support also from the economists at the UiO was an important issue. Third, one had to outline the major elements in an operational strategy for the implementation of the reform.

The project started in August 1988. From the beginning it appeared to be just another theoretical research project¹¹⁸. It was explicitly said to be directed towards a further development of the theoretical principles of a market based system, and should be conducted without much attention to the existing institutional, organizational, judicial and political characteristics of the sector. Initially, it appeared no to be clear - at least not to Hope - that this work should serve directly as the basis for a new and rapidly implemented legislation (Thue, 1996:100).

Hope saw his role as a scientist in a classical, positivist sense. One should not intervene directly into politics, but distinguish clearly between the scientific provision of alternatives and arguments in accordance with high scientific standards and the political responsibility for taking the political choices¹¹⁹. The turning of the project into an operational reform initiative became explicit later in the winter 1989 – apparently as a consequence of a decision to speed up the process. As we shall see later, the immediate background for this move was the surprising re-emergence of the hierarchical restructuring program at the time – forcefully supported by its traditional supporters within the AP in parliament. At this later stage, Hope was asked to present more practical and operational proposals for the actual implementation of his market system in order to advance the market reform alternative in accordance with a very tight time schedule - forced by the rival collective of actors.

The implementation oriented part of the project to this point had been largely carried out by FD delegate Eivind Tandberg, who served as the operational project coordinator at SAF and as the inter-mediator between the Hermansen actor-network in the state administration and the Hope actor-network at the SAF. Through the role of Tandberg, the more operational and political preparations by the FD/OED could be carried out as a project within the project at the SAF. Tandberg was responsible for the chapter “Scenarios for market based power trade in Norway”¹²⁰ at the end of the final project report (chapter 6), which outlined in brief the main steps in an eventual implementation process. In cooperation with Berit Tennbakk, he was also

¹¹⁸ The governance committee appointed by FD and OED was: Deputy director Per Haakon Høisveen, OED, department director Svein Storstein Pedersen, NVE, deputy director Arild Sundberg, FD and head of department (from December 1988) Sigurd Tveitereid OED.

¹¹⁹ Confirmed in interview with Einar Hope, 20.11.98

¹²⁰ My translation

responsible for the comparative study of foreign electricity systems and electricity market reforms. Hope and his staff of researchers also spent a few days on the implementation issues – while preparing the final report.

The report “Market based power exchange in Norway”¹²¹ was published in March 1989 - only 8 months after the project had been started up. Apart from a group of 12 researchers and research assistants directly engaged in the project group, a number of other researchers at NHH had been involved in the 10 sub-reports which contained both specialized theoretical analysis, empirically oriented studies of the Norwegian electricity sector and comparative studies of international electricity market reforms (Bjørndalen et al: 1989:forword). As such, the project reveals a quite impressive capability to mobilize and coordinate scientific resources within a short period of time, which covered a fairly broad range of scientific fields. No doubt this contribution could not have been done without the SAF research organization, the scientific networks it had already established and the range of electricity sector studies conducted through out the 1980s in interaction with both sector practitioners, state administrators in the NVE/Statkraftverkene and international research programs. As such, the work was essentially a structuring and a pulling together of contributions which were ready at hand.

The report came to represent a very important element in the further process by providing a representation of the market reform alternative in the form of a written document. Its role became to mobilize support through visualization, explanations, scientific arguments and authority. It provided guidelines for the work on the new legislation as well as for the re-configuration of sector institutions, organizations and trading systems. The scientific research project thereby had become a project for its actual becoming reality through political-administrative processes, for its own breakthrough, rapid expansion and possibly for its stabilization as a real life system within the electricity sector.

11.1.1 The content of the market reform report

The research project was organized so as to address a variety of issues which on the one hand were important ingredients in the reform, and on the other hand drew substantially on earlier research. It was essentially a structuring of the different elements involved and a production of fairly popular presentations. According to Einar Hope:

¹²¹ Bjørndalen, Jørgen, Einar Hope, Eivind Tandberg and Berit Tennbakk, 1989: “Markedsbasert kraftomsetning i Norge”, SAF rapport nr. 7.

*“We did not develop any new theory or apply very advanced theories. What we did, was to apply fairly simple theoretical contributions in a practical manner”.*¹²²

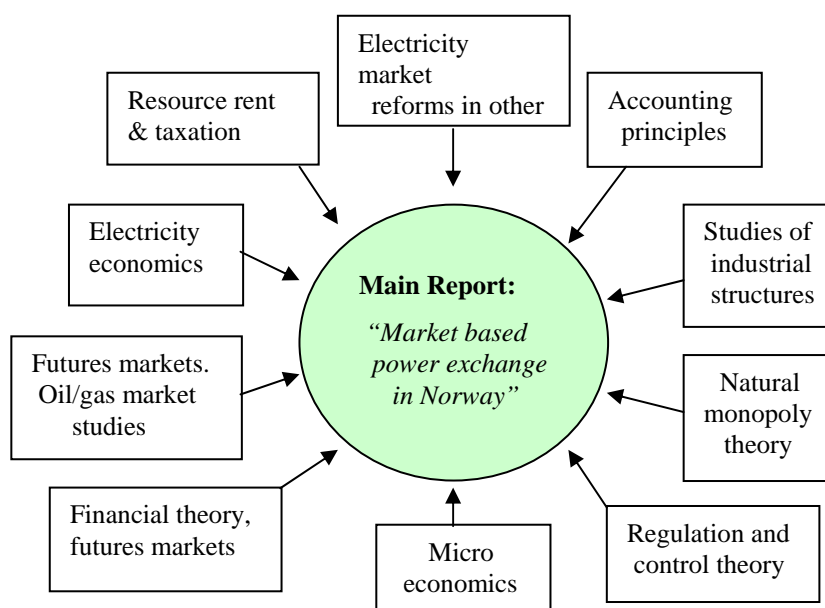
One of the sub-reports was provided by Morten Berg on the subject “Priority of delivery”¹²³. Another was by Eirik Schrøder Amundsen and concerned “Resource rent, efficiency and income distribution”¹²⁴. Other contributions concerned the need for an accounting reform (finance and accounting theory), a study of horizontal and vertical integration in the electricity sector (industrial organization theory), an elaboration on the principles for the organization of electricity network system (natural monopoly theory), a discussion of state regulations of natural monopolies (game theoretical regulation and control theory), demand side issues (micro-economic price theory), the organization of markets for risk (finance) and a specific study on the application of a futures market approach in the hydro-power system (finance, oil and gas sector concepts). Among these studies, the work regarding organization and regulation of the “natural monopolies in electricity transmission and distribution” represented new contributions to the bulk of theorizing which already had been worked out. The work on an accounting reform was also “new” in this particular sense. The following provides a visual overview of the research projects involved.

¹²² Interview with Einar Hope, 20.11.98

¹²³ Berg, Morten, 1989: “Prioriterte leveranser”, SAF-arbeidsnotat nr. 9. My translation.

¹²⁴ Amundsen, Erik Schrøder, 1989: “Grunnrente, effektivitet og inntektsfordeling”, SAF-arbeidsnotat nr. 12. My translation.

Figure 11.1. Overview of the market reform representation in terms of its sub-reports



Based on a joint market economic re-framing of the sector, the various sub-projects contributed with a great number of elements and ideas on how the electricity sector could be re-shaped, how specific economic measurement and control systems, trade systems etc. could be introduced to increase economic efficiency or solve specified regulation and control problems. Several of these sub-reports came to represent the starting point for later sub-system reforms during the 1990's which gradually and piece by piece transformed different features of the electricity sector.

11.1.2 The main report and its arguments

The main report (Bjørndalen et al, 1989) presented and discussed the core concepts of the market reform. Here, Hope for the first time – within half a page - explicitly refers to the international debate on market reforms in electricity sectors in other countries and thereby to some extent relates his reform program to international developments. Three different reasons for the international debate on electricity market reforms are referred to. First, there is an argument about the mature stage of development of the sector, which was said to indicate a shift from investment orientation towards

emphasis on the efficient operation of the established system. Second, there is a pointing to the international movement towards deregulation of public sector industrial sectors like telecommunication and transport, and finally, Hope pointed at the growing concern about possible inefficiencies in the use of resources within the electricity system. Of these three arguments, the last rationale obviously represented the historical and scientific mission of Hope's project, which dominates the argumentation through out the report - with a focus on efficiency improvements rather than deregulation.

11.1.2.1 Demonstrating empirical knowledge

The main report contains four major parts. The first is an introductory part (chapter 3) which presents a brief overview of the electricity sector and points out some of the technological, institutional, organizational and economic specifics of it. It also presents several charts over regional organizational systems within the sector which serve to demonstrate the awareness of the authors about the great institutional complexity of the sector and thereby defend the report from possible objections to the market reform program for not being based on sufficient insights into real world system. The short-hand textual references to various governance system elements, political governance through public property rights, the various license systems, the state power contracts, the public sector accounting system and the special tax system within the sector, also serve to demonstrate substantial empirical knowledge.

11.1.2.2 Providing the basic arguments for the market solution

In the second part (chapter 4) the report presents fundamental concepts within economic theory in a standard textbook version. That is, the pareto-efficiency solution of the welfare theorem and a brief discussion of standard textbook deviations like imperfect competition, collective goods, external effects, incomplete information and transaction costs. Then, the basic critique of pricing and investment principles and practices within the sector is presented along the lines described by Hagen, Berg and Hope in their 1986-report. The presentation is obviously not directed towards economic scientists, but rather towards a broad audience where the purpose primarily is to present the basic arguments of economic theory on which the electricity market reform rested and the core scientific arguments against current practices within the sector

11.1.2.3 Presenting and discussing the applicability of the new market system

The third part (chapter 5), which is the main chapter of the report, presents the new electricity market system. The analytical framework applied is the "structure-conduct-performance (SCP)" concept which was at the core of

Einar Hope's early research program. To the basic and in principle deterministic causal model, two additional variables were added; uncertainty and public regulation. Where as uncertainty mainly contributed by modifying the otherwise deterministic causal relationship between structure and conduct and between conduct and performance, public regulation represented the independent variable to be manipulated in order to change the system – both directly through exogenous interaction and indirectly through causal effects which derived from the changes in industrial structures from these exogenous interactions.

After discussing the complex measurement and realisticness problems involved in the analysis, Hope goes on to present the market model, to discuss its application to the electricity sector and to compare it with the hierarchical restructuring approach.

Hope finds that the Norwegian electricity sector appeared to be less decentralized than what would have been expected to be found in a market based system. Despite the many cooperative and hierarchical systems and structures within the sector, he does not see it as a very tightly coordinated or centralized system, and argues that the institutional preconditions are largely suitable for a market based system - with a fairly large number of relatively autonomous economic entities. The content of this judgement seems to be that the system had sufficient organizational entities for a competitive market to be credible, but that the entities were not sufficiently autonomous from larger cooperative or state hierarchical governance systems, which accordingly should be deconstructed through the implementation process.

He goes on to point at the dominance of production interests within the system and argues that the demand side was too weakly represented, which led to a limited concern with consumer needs and consumer adjustments to market supply conditions. The current system was seen as “technologically and administratively” defined rather than defined according to economic criteria.

The publicly owned companies are seen by Hope as non-rational economic actors. They were following objectives which deviated in important ways from what would have been expected from “economically rational” market actors. However, given the explicit constraint not to touch public property rights, he notes that behaviors are assumed to be changeable through adequate reforms within the sector - without changing property rights. That is, structural changes cause changes in conduct and performance. But, he also notes some skepticism about the realism in this presupposition. Disregarding these problems, he argues that the sector should be organized

so as to maximize welfare efficiency and warns that following other possible conflicting targets would reduce the ability to achieve wanted economic results.

Following these basic arguments for the market reform - he presented the market based system and discussed its different functions such as production, transmission, distribution and consumption, the related types of actors and the application of the general price- and investment theory to a decentralized decision system in the competitive part of the system. He also noted various regulatory approaches to a centralized governance system in the natural monopoly part of the system. Then, each of the functions are discussed in some detail before, finally, there is a critical discussion of the hierarchical program for horizontal and vertical integration. Where as the report admitted that there might be efficiency gains from horizontal integration between small distribution companies, integration between generators and vertical integration between activities which can be characterized by completely different cost functions, were seen as usually inappropriate for the efficient functioning of a market based system. (p 123). Compared to Hveding's system design approach, the economic framing did not focus on the contribution of different technologies to over all system efficiency, but on differences in the cost structure of various types of activities and on the efficiency of each individual activity.

The presentation is non-academic in the sense that references to international academic debate is absent. What is being referred to is the various sub-studies of the research project in which different academic contributions had associated the authority of their research areas behind the reform initiative. This approach both served to maintain a fairly popularized style as well as to provide Hope with a broad set of theoretically advanced applications to specific elements of his model, and thereby a persuasive capability to fight off objections also at the micro level of economic and organizational analysis.

11.1.2.4 The main elements of a re-configuration of the industry

The final part of the report, chapter 6, presents the more operational "scenarios" for the implementation of a market based system. What is denoted "scenarios" are actually short hand presentations of the main elements in an integrated regulatory reform; the main elements of a re-configured electricity industry. These elements were:

- 1) the establishing of a market institution,
- 2) the establishing of a national transmission company,

- 3) the re-organization of the distribution companies,
- 4) the re-shaping of the role of Statkraft in the power market and
- 5) the regulation and political governance principles and approaches.

The first element contained the free access principle and the establishing of a jointly organized spot and futures market organized by a joint stock company denoted “Kraftsentralen AS”. This company was thought of as resulting from a reorganization of Samkjøringen into a more “modern” business-like organization, however still owned and controlled by the generators. The company should both function as a clearing house and as the operator of the electric pool system in coordination with a national transmission company. SAF accordingly suggested a continuous “cooperative” control of the market institution rather than state ownership, similar to the new English power pool institution which became established in 1989.

The second element, a transmission company “Transkraft AS”, was suggested separated out of Statkraft. The company should only be responsible for electricity transmission within the national grid, should not be allowed to trade with electric power and should have a general contract with Kraftsentralen AS about conditions for high voltage transmission based on the free access principle. Ownership was to be clarified later, but it could either be a state owned or jointly owned by the power companies (like in England).

The third “scenario” presented a program for reorganization of distribution companies. They should be organized as joint stock companies and managed according to business economic principles and business accounting systems. Here, it was also added that property rights should be clarified further – another hint from the economists at the distrust in a continued public ownership system. Distribution should be separated from transmission and should be managed and regulated according to a cost minimization principle. It should be operationally separated from electricity trade and organizationally separated from electricity production. The traditional area concession and obligation to supply system should be abolished, and distribution should be subjected to state organized monopoly regulations.

The fourth element regarded the organization of what remained of Statkraft after separation of transmission activities. The report here argued that established electricity contracts should be changed at their expiration according to standard market conditions, which would imply that future contractual terms should be decided in the market rather than in the

parliament. The company should operate just like any other actor in the market – as a profit oriented enterprise. In order to prevent the company from exploiting a dominant market position, the report suggested to restructure the company – for instance through an internal separation into regional generating divisions. Also the organization of electricity trade with foreign markets was suggested reorganized from the Statkraft monopoly system to a competitive market system with direct participation by foreign actors in the Norwegian market.

11.1.2.5 Arguing with the hierarchical restructuring approach

In the fifth and final point, the report suggested to establish the welfare economic objective as the only relevant criteria for state economic regulatory systems, aimed at securing efficient competition in the power market and efficient monopoly control in the “natural monopoly” system. Regulations and political interventions which were not based on such economic principles, should be excluded.

Finally, the report summarized some of the critique of the hierarchical restructuring reform program and pointed out that a market reform could not be established on the basis of a reform based on that approach. The arguments here were the more pragmatic and structural ones, where as the main theoretical arguments against a hierarchical system in general – such as the basic critique of the LRMC pricing principle - were left out. Because this final discussion has a conclusive character, this fairly “pragmatic” summary of the critique of the hierarchical alternative might have weakened the persuasiveness of the report towards the hierarchical restructuring reform alternative. Also the summary in chapter two, lacks references to the basic theoretical critique which for instance had been presented by Hagen and Berg, which were referred to in the middle of chapter 4. In this respect, I think it is fair to say that despite the substantial mobilization of scientific resources, the report did not pull some of the most essential contributions together into a final, concentrated and persuasive row of rhetorical arguments with a capacity to really “shake” the hierarchical program. To find these arguments, one had to search through the entire report of 135 pages. As the concluding arguments appear from a quick look, they seem to present an alternative to the hierarchical program with differences which mainly have a pragmatic, operational and “system of thought” character.

Given the political efforts to mobilize the hierarchical reform alternative in early 1989, this conclusion is a bit puzzling. What can explain that even though potentially more “damaging” scientific arguments were available, these were not pushed up-front by a project which was to be used directly to overthrow its hierarchical reform rival through scientific arguments? Perhaps

it can be found in Hopes “non-confronting” personal style and reluctance to engage directly in the political game? Perhaps in the practicalities which resulted from tight time constraints? Or from the analytical framework, which used the structure-conduct-performance scheme as the basic conceptual framework. This directed arguments in the direction of “structural” and “relative improvement” arguments rather than those derived from the core of micro-economics.

With the market reform report from SAF, the scientific research program had been turned into a political program for the actual remaking of the sector, but it was by far a complete operational reform alternative. In particular, it lacked the judicial part, which had to be worked out by the OED.

11.2 Disputes and alignments with UiO economists

In the previous chapter I have indicated that with the restructuring of the FD in 1986 and the Steigum committee, the scientific-political hegemony within the economics community moved further from the UiO/SSB to NHH/SAF/NB – and from the Oslo School to the Chicago School of Economics. In this situation also the electricity market reform became an object for some controversy between economists at the two academic institutions, which in part reflected the strong hierarchical/econometric/formal modeling tradition in Oslo and the more empirical and industrial organization oriented tradition at NHH. When being presented the reform proposals, UiO economists like Steinar Strøm and Finn Førsund were not fully prepared to accept the market project, and argued that the electricity sector governance system should at least in part be based on professional, centralized control with investments, pricing and operational coordination within what was essentially one technically integrated system.

The confrontation also reflected the strong beliefs in the need for advanced mathematical calculus at the UiO as opposed the more pragmatic and micro-structural reform approach represented by Hope - broadly supported by the NHH economists¹²⁵. With the mathematically oriented research projects carried out by Morten Berg and others, however, the NHH economists also had some calculus to present to back their arguments – in particular in relation to the natural monopoly part of their re-framed electricity system.

The dispute also came to include the local subsidiary of the SAF at the University of Oslo – the SAF-Oslo, where scientists working with SAF

¹²⁵ Interview with Einar Hope, 20.11.98

research projects were members. When Finn Førsund became a scientific advisor for Statkraft during its struggle to maintain a dominant role in the network balancing system as well as its efforts to prevent the company from being separated into smaller units in line with Hope's reform program, this created substantial tensions within the SAF.

The NHH economists had both taken over as the major counterpart to the FD and had produced an operational alternative to Hveding's system design approach, based on the basic argument of the economists in the 1970s. There was accordingly no serious doubts about who had the more powerful arguments and the operational alternative, and in the end, there was no serious opposition from the UiO economists in general to the new market approach. Einar Hope could calmly note that there should be room for different points of view also within the SAF. While sinking a bit of their professional pride, most UiO economists gave their support to the market approach and thereby secured a broad professional support from the economics community to the reform process.

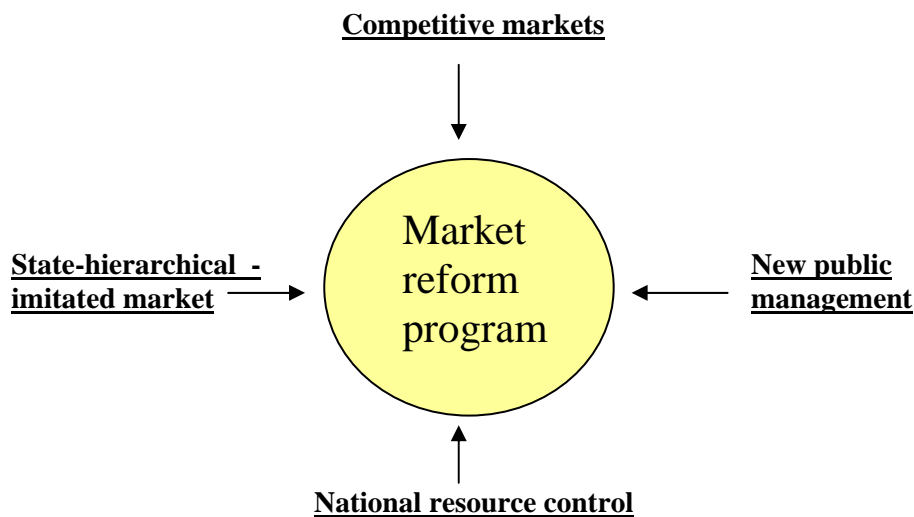
Nevertheless, Hope and his colleagues had to use some time finding the proper arguments against Førsund's insistence on the need for substantial hierarchical coordination and control, and to develop additional concepts to provide alternative operational solutions. To Hope, a crucial point in the reform approach was to reduce the dominant role of Statkraft in the network balancing and in the foreign electricity trade systems. One of the major controversies in the previous system pointed at by Hope in his 1983 Statkraft report, occurred because Statkraft in reality was responsible for short term physical balancing of the system, which together with its monopoly on foreign trade provided the company with opportunities for strategic price manipulations. Another crucial issue to Hope was to prevent the new "Transkraft AS" network company from becoming engaged in power trade and thereby confuse its intended new role as a neutral provider of transmission services to all market participants. Both these objectives were threatened by the efforts of Statkraft to defend its unity as well as its traditional unique positions in the electricity sector - with the apparent support of Førsund.

The controversy however, stimulated the development of the idea about a separated market for short term regulatory power; the regulatory market, as a market based system to take over the short term network balancing responsibility from Statkraft. The new concept permitted all generators to provide such services on equal conditions in a centrally organized, separated auction system.

11.3 Relations between the new market reform program and its major historical rivals

The electricity market reform as it became shaped in between the electricity market approach at the SAF and the modernization of the social democratic party, can be seen as a juxtaposition of several basic programs characterized by different simplified cores. The character of the Norwegian reform accordingly followed from the specifics of this particular mix, obtained through its creation process. In figure 11.2. below, I have outlined the program as a juxtaposition of four different core elements.

Figure 11.2. Core concepts within the market reform program



“The competitive market” represented the new market approach within economics associated with Friedman, Hayek, Stigler etc. It was clearly the main interest and target of the SAF researchers and essentially grew out of their efforts to expand the occasional power market administered by Samkjøringen and later on to create an extended economic system based on standard market economic concepts. The competitive market element received strong support both from the right wing political opposition and from those engaged in modernizing the social democratic party.

“The state-hierarchy - imitated market” was the actual approach to the second half of the electricity system; the transmission and distribution part of it. The concept rested on an economic rationalization provided by the

concept of a “natural monopoly” - which derives from a specific cost structure of production. From this concept, the SAF economists in essence argued that the transmission and distribution network system should be organized in accordance with a hierarchical principle, governed by the optimal tariff theory and submitted to monopoly control by the state regulator. This was clearly an “imitated market” approach basically similar to that of Oskar Lange and EdF. The optimal tariff theory presented by Morten Berg represented a SRMC pricing approach to such a hierarchical system in which unit prices were set according to the SRMC principle where as cost recovery could be obtained through adjustments in fixed annual fees paid simply for being connected to the electrical grid.

The third simplified element, “the new public management” concept, represented a radical separation of economic actors from economic regulators and the idea that public sector economic actors should organize themselves in accordance with “business principles” – associated with capital ownership and profit maximization. Apart from the insistence on a general accounting reform and an unbundling of competitive activities from “natural monopoly” activities by separated accounts, the program did however not contain any suggestions regarding compulsory changes in electricity company organizations. The principle of pragmatic organizational flexibility advocated by the Hermansen committee and Johan P. Olsen, left it to each company to choose appropriate organizational forms. With regard to the state electricity administration, the basic concepts had already been established through the separation of Statkraftverkene from NVE in 1985/86. The program outlined a further radical re-structuring of Statkraftverkene – both in terms of separating different types of activities and in terms of abolishing its “unique” roles in the electricity system.

Finally, “the national resource control” element tied the market reform into the fundamental constraints of principles inherited from Gunnar Knudsen and the early concession law process. National (and political) control with the large hydro-power resources represents a basic and nearly unchallenged principle for the political regulation and structuring of the electricity industry in Norway – organized through a complex system of legislation. Given the relative weakness of Norwegian private interests, a continued national resource control was obviously linked to a continued strong institutional lock-in of public property rights.

11.3.1 Conflicts and links with historical programs

In the following I will “speculate” in short over possible relationships between the market reform collective and its various historical rivals within

the sector in order to trace major frontlines of rivalry as well as foundations for possible links between them – for a capacity to “hook up” with each other.

It was first around 1985-86 that the reform program became explicitly formulated within main-stream economics as a general market equilibrium concept similar to the credit market reform. Even after this, and perhaps in particular due to the specific scientific orientation of Einar Hope, the program maintained a strong empirical orientation which tended to separate it from close affiliation with deregulation processes in other countries. This – I think – strengthened the ability to construct a realistic reform program within the Norwegian context as well as to associate with and to gain support from historical collectives with substantial locked-in power positions. The single most important contribution to this mediation of the program however, appears to have been the constraint not to touch property rights imposed by the AP government – without which opposition against the market approach from both the local cooperatives and the state-hierarchical actor networks would probably have been devastating.

11.3.1.1 The market reform program versus Hveding’s system design program

To the Hveding system design collective, the program presented by the SAF represented an answer to its claim towards the economists in the 1970s that there was no operational alternative by which their SRMC pricing principle could be applied and aligned with the LRMC investment principle. By providing a possible solution, the LRMC pricing principle represented by Hveding was forced into a retreat. What obviously remained however, was a serious concern with the ability of a market based system to deliver investments on time – due to the long planning and investment periods involved and the large stochastic variation in precipitation which would cause market prices to vary substantially from year to year. There was also a concern with the ability of the market to deliver the appropriate investments from the point of view of the different contributions of individual investments to the overall efficiency of the system. Thus, without having institutional positions within the state administration nor in principle economic arguments to oppose the market alternative, Hveding and his associates probably remained essentially skeptical and likely to support elements within the system which maintained a capacity for integrated and planned system design and which might restrict the role for the competitive market in providing new generating capacity.

The natural monopoly part of the market program however, corresponded more closely to Hveding’s system design approach. Also the business orientation provided a possible link between the two programs.

11.3.1.2 The market reform program versus the hierarchical restructuring program

These two alternatives emerged as the two major rivals during the political-administrative decision process to come. In conceptual terms the competitive market and the organizational integration approaches represented opposite principles along the classical market versus hierarchy dichotomy, associated with the traditional right-left ideological delineation. Beyond the ideologies however, there were also possible links. In particular the natural monopoly concept, the strong emphasize on the role of a professional, centralized state regulator and the (reluctant) admittance on behalf of the market program that efficiency gains may follow from horizontal integration between relatively small electricity companies, provided a role for and a “world model” with roles and distribution of governance and control rights with striking similarities to that of the organizational restructuring program. In fact, the additional legitimacy from additional economic arguments could be seen to have strengthened the authority of a centralized governor/regulator, and new concepts presented by the market program provided challenging new opportunities for a state regulator to influence the future shaping of the sector.

The role of Statkraft however, represented the obvious target of controversy between the two programs. In the state-hierarchical restructuring program, the company represented the national level of planning and coordination in the “Norgesdrift” system as well as the link to foreign electricity markets. In the market program, the national company had become separated along functional lines and its roles in national as well as international electricity markets had become reduced to those of other electricity companies. One might say that the organization of Statkraft was one of the prime targets of the market reform program, where as the NVE received the legitimacy of the “ideal representation of collective social interests” associated with the state regulator in economic theory. In this respect, one should expect a different attitude towards the market program from NVE officials than from Statkraft representatives.

11.3.1.3 The market reform program and the local cooperatives

The local cooperatives were basically opposed to the state-hierarchical program – in particular the state-county model represented by Vinjar, but appears to have been completely unable to mobilize any substantial support for an alternative based on sound (scientific) cooperative economic principles. Hence, the powers of the cooperative program resulted basically from locked-in institutional and organizational structures and from a strong

political and managerial desire to maintain autonomy from state or county directives and interventions.

The cooperatively organized electricity companies and their municipal principals to a large extent rejected the profit oriented firm as represented by the market reform program, and maintained that their electricity companies in essence were similar to requisite societies in that their purpose was to maximize utility to their consumers through low prices rather than to gain profits to the owners. This cooperative position had however come under pressure from the market re-orientation during the 1980s and obviously suffered from inadequate theoretical defense. A new generation of managers were already engaged in “modernizing” their cooperative electricity companies, primarily by applying concepts developed within business economics.

Local cooperatives accordingly should be expected to represent a mixed response. Basically they would reject the concept of business orientation as well as market competition within their supply areas, but would be likely to support the market program rather than the state-hierarchical in order to defend local autonomy. The promise not to touch property rights and organizational forms was probably a necessary concession for the market reform collective to establish links to any substantial share of the local cooperatives. On the other hand could some of the “modernized” electricity companies and the new generation of managers be expected to support the market program more actively as their “world models” in essence were quite congruent with the market program.

The cooperative organization Samkjøringen, could be expected to support the market reform due to the substantially increased role for the various markets organized and operated by the organization. Samkjøringen had been working with Einar Hope for a number of years and the organization was clearly thought of as the market institution also in the future system.

11.3.1.4 The market reform program and the large scale power intensive industry collective

The large scale power intensive industry program had come under severe attack in the 1970s. Through the 1980s, representatives of the industry to an increasing extent argued for an increased role of the market within the electricity industry in response to the political difficulties in parliament. By taking the step into saying that the industry preferred to negotiate contracts in the market rather than with the politicians, many also recognized that the industry with its competence and resources would have a number of advantages within an open competitive system. In particular Norsk Hydro –

the second largest power generator - appears to have seen these opportunities rather early (Reiten, 1988).

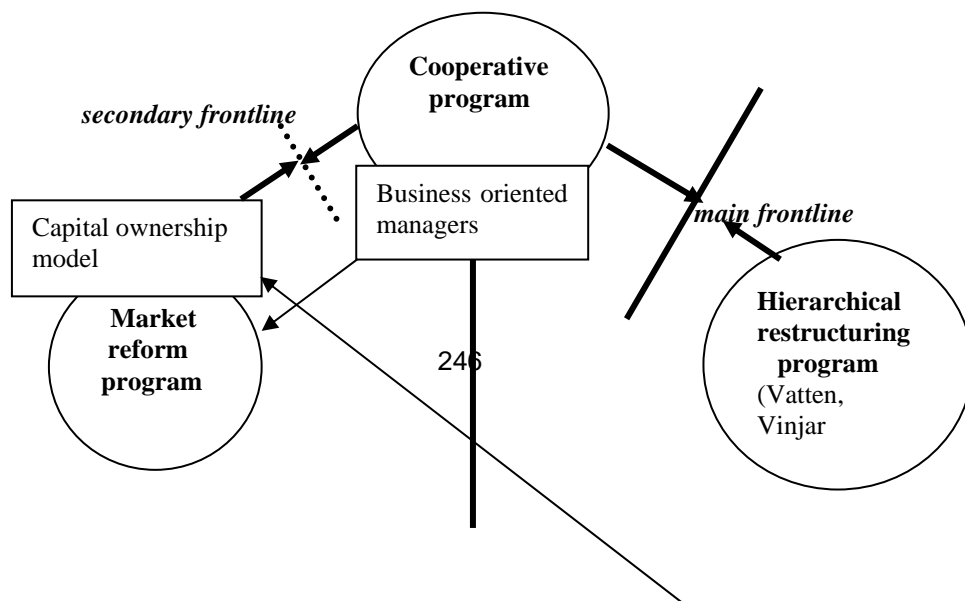
Of particular interest to these companies – in case of a market contracting system – was to deconstruct the Statkraft monopoly on foreign electricity trade. During the 1980s, the industry had expanded internationally by purchasing factories for semi-finished and consumer products in various countries, and now they saw opportunities for trading electricity across national borders to supply these subsidiaries. From being closely associated with the state-hierarchical program, it appears that the industry to a large extent was prepared to support the new market program.

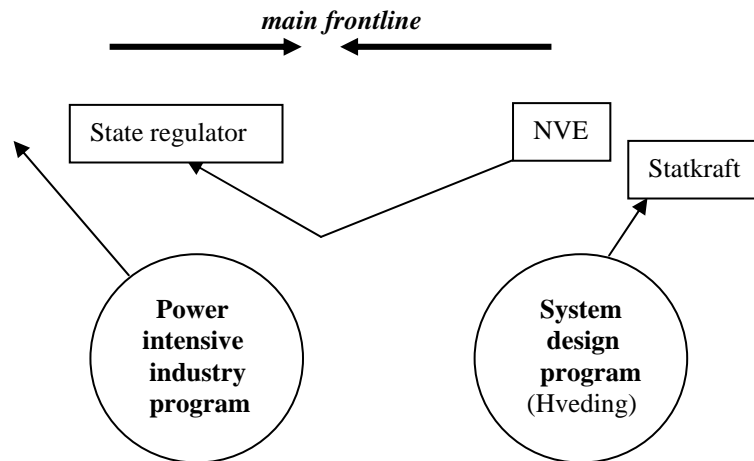
11.4 Powers, congruencies and strategic positions in market-making projects

Through a large number of research projects and mediations, the market reform program had been turned into an entrepreneurial collective with substantial authority which both derived from positions within the state political-administrative system and from economics as a scientific discipline. With the 1989 report from the SAF and the alignment of the Norwegian economics community behind the reform program, further important steps towards a decisive breakthrough had been achieved.

The program had also been specifically shaped so as to become acceptable to dominant actor networks within the sector as well as within the political community. Despite obvious frontlines of conflict there was a number of possible links between the new market program and its most important rivals within or associated with the sector. In figure 11.3, I have illustrated the main frontlines of rivalry as well as indicated possible links between the major programs involved.

Figure 11.3. Major frontlines and possible links between the rival programs





Bold lines and bold arrows indicate frontlines of rivalry. Other arrows indicate important links between different programs.

The figure illustrates what we may call the different strategic position of the two major rival programs; the market reform and the hierarchical restructuring reform. Where as the hierarchical restructuring program faced two different frontlines; one towards the cooperative program and one towards the market reform program, by tuning down the issue of property rights and organizational form, the market reform program faced only one major rival; the hierarchical restructuring.

In the next chapter, I will investigate into the rivalry between these two entrepreneurial collectives during the political-administrative process towards a decisive breakthrough.

12 Hierarchical restructuring or market reform? The decisive breakthrough

On April 28th 1989, four weeks after Hope had completed his report, the Brundtland government presented its proposition for a new energy law¹²⁶. It did not contain any market reform, but a hierarchical restructuring reform relatively consistent with the report from the Energy Law Commission in 1985 and with what had been presented to parliament by the coalition government in the 1984/85 energy report¹²⁷. What had happened? Had the market reform collective failed? Was it too late?

Supporters of the hierarchical restructuring reform within the AP had apparently managed to fight off their market oriented rivals and to force through a decision within the government to go for the hierarchical reform. They were also in a hurry to get the law approved by parliament before the 1989 parliamentary election in September. On the other hand, the new bill was presented four years after the commission had finished its report and three years after the Brundtland government had regained government control. To the hierarchical restructuring collective, this was quite a period of time to wait for further progress.

The Minister of Petroleum and Energy, Arne Øien, on behalf of the government, had actually been quite supportive to the market reform alternative, where as in particular AP representatives in parliament were against the idea and remained loyal to the hierarchical program which had been initiated by another AP government in 1960. This program had since then been the major contribution from the party to efforts to increase economic efficiency within the electricity sector. (Thue, 1996:91).

At the time, the AP leadership and the government were deeply engaged in preparations for a Norwegian membership in the EU, where the EU Commission as part of its efforts to establish the internal market in 1991 also mobilized to break into the highly protected energy sector in order to include it into the new open market system. Even though this may have provided additional arguments for those in favor of the electricity market alternative in Norway, the government's presentation of the hierarchical restructuring alternative in a situation where a market based alternative was indeed

¹²⁶ Odelstingsproposisjon 73 (1988-89)

¹²⁷ The report did not receive much criticism in parliament at the time. Innst. Stortinget, 218 (1985-86)

available, illustrates - I think - that the EU issue did not substantially influence the Norwegian electricity legislative reform process at the time.

12.1 Mobilizing the hierarchical reform alternative

The AP leadership had shown no particular interest in pushing the hierarchical restructuring reform right in the middle of its strive to hammer out its “renewal of the state” program – and its modernization of the party. Facing this re-oriented party leadership in government position and being gradually aware of the emerging challenge from the new market reform initiative, the hierarchical restructuring collective had to turn to the doors which were open to it to mobilize for a rapid political breakthrough. The approach became to pull the case out of the ministry and over to the parliament. The initiative thereby shifted to the AP representatives in the Energy- and industry committee, where Kjell Opseth played a leading role in addition to Anne-Lise Gjörv and Arve Berg. The AP-members in the group – jointly with the SV representative – supported the hierarchical restructuring reform initiative strongly and asked Arne Øien to present the bill for parliamentary treatment¹²⁸. The political initiative forced the two alternatives into a situation of intense rivalry along different frontlines within the political, the state administrative and the electricity sector arena.

12.1.1 The hierarchical restructuring collective

Which were the strongholds of the hierarchical restructuring collective at this point in time? Apart from NVE and the Waterway and energy supply department within OED, Statkraftverkene mobilized on the hierarchical side, and with it, its trade unions which had close relationships to AP traditionalists within the Confederation of Trade Unions (LO) – and to the traditional post war power base within AP associated with the state - large scale industry program.

When Gunnar Vatten took over as the managing director of Statkraftverkene in 1986, the company came to play a leading role within the collective. Within the modified EdF-like organizational model, Statkraftverkene was in the key position as the national vertically integrated company on top of the 20 regional ones from where planning, investments and electricity trade could be orchestrated and enforced. As such, it represented the very “heart and brain” of the Vinjar/Vatten model. Also the trade unions within

¹²⁸ Interview with Arne Øien by Bath Jacobsen, 1998:167

Statkraftverkene had been mobilized in opposition to the attempt by the coalition government at turning it into a joint stock company at a distance from political interventions from parliament - and from lobbyists. Now, they pushed further to strengthen the role of the state company in the future electricity supply system within the frameworks of a public sector governance system.

The support for the vertical integration approach had apparently also been further strengthened within Statkraftverkene after an initiative from the Høyre parliament group in a letter to OED on May 9th 1988¹²⁹, where the party asked to receive an orientation about possible consequences from a further market oriented restructuring of the state power company, included a transformation to a joint stock company, a partial privatization and a regional separation of the company. This was the threat to the ambitious semi-autonomous state electricity company. A committee pointed out by OED (Erling Diesen) and Statkraftverkene (Gunnar Vatten) was established on September 30th 1988 to work out an answer under the leadership of former AP Minister of industry; Finn Lied. Also Vidkunn Hveding, who as we know was a member of Høyre, was included in order both to increase the political legitimacy of the committee and to mobilize Hveding's authority on electricity economics and electricity system design to work out an offensive strategy to meet this challenge.

The arguments presented by the committee leaned closely on to the ongoing work within the Hermansen committee, and suggested a model for Statkraftverkene similar to that of Statoil; a 100% state owned joint stock company in combination with a paragraph which secured political control in cases found to be sufficiently significant for political and social interests¹³⁰. The committee also suggested to reorganize the company into a corporate structure where different types of activities could be separated into subsidiaries. The answer presented by OED was accordingly, on the one hand to "modernize" the formal ownership structure into a "business oriented joint stock company model" and thereby also increase its commercial autonomy, and on the other hand to reject any split-up of the company or any other initiatives which would reduce the governance control of its top management and the key roles of the company in the future electricity sector system. A market oriented "corporate hierarchy" became

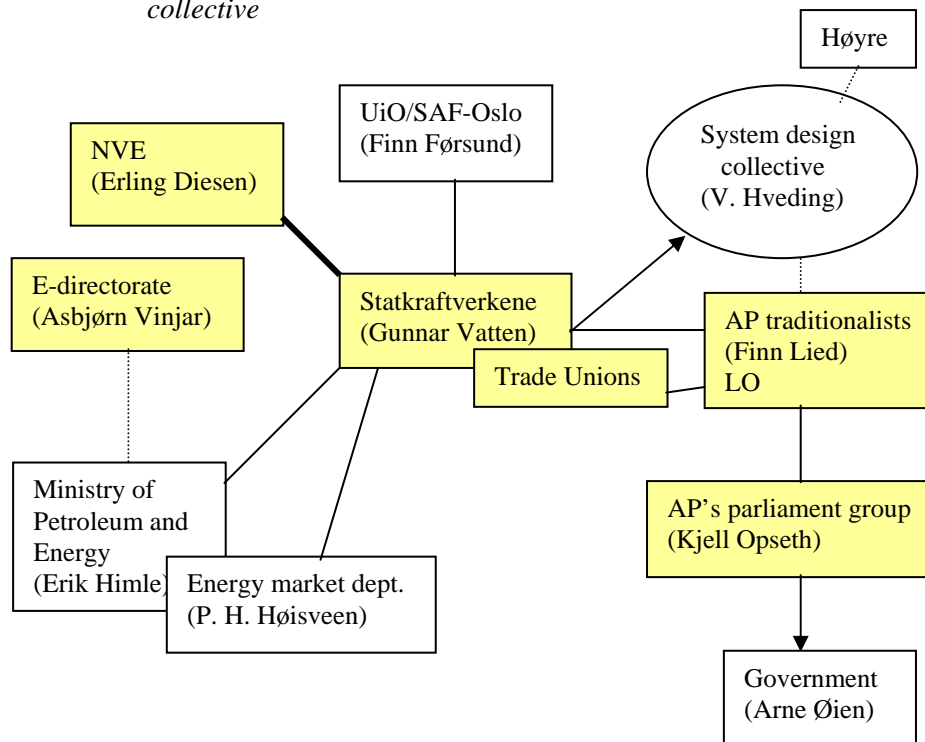
¹²⁹ Barth Jacobsen ref: OED files: Doc. no. 9854P/003.1., 1998:163

¹³⁰ Barth Jacobsen, 1998:164

the defense model against the neo-liberal push for privatization and down-building of market power.

The hierarchical restructuring collective behind Kjell Opseth and the other AP representatives' initiative in parliament, could be outlined as follows:

Figure 12.1 The entrepreneurial hierarchical restructuring reform collective



As we remember, Gunnar Vatten had been the leader of the E-directorate where he worked on the program together with Asbjørn Vinjar and Erling Diesen. In 1978 he took over the Energy market department within the new Ministry of Petroleum and Energy where he engaged Diesen to work out the government's new energy report to parliament which ended with the Energy Law Commission in which Diesen also played a major role. Within the OED, head of administration Erik Himle, had also been an important supporter of the hierarchical reform initiative. As managing director in the now semi-autonomous Statkraftverkene, Gunnar Vatten came in a key networking position in between the state administration, the trade unions and the politicians in parliament.

OED-minister Arne Øien was the one to receive the pressures mobilized. As an effect of the political and institutional powers mobilized in parliament which provided a majority support in the AP parliament group to support a new legislation based on the report from the Energy Law Commission, he and the government were forced to represent the hierarchical program, to work out an appropriate legislation and to present it to the parliament.

The report from the Energy Law Commission in 1985 had been handed over to the OED where Per Haakon Høisveen¹³¹ who had worked with Diesen in the commission, in late 1988 presented a proposal based on the report from the commission. But Øien – being influenced by the Hermansen network - rejected it¹³². The case was then transferred to Tveitereid in his new Energy department, and Tveitereid and Høisveen were asked to work out another proposal together. The Hermansen-network had thereby managed to take at least partial control within the administration. This is about the time when Einar Hope in Bergen was asked to come up with practical solutions to implement his market reform alternative. If the hierarchical program went to parliament, the market alternative obviously ought to be available for the political debate.

But Opseth and the AP-group in parliament rejected the market oriented suggestions worked out by Tveitereid and Høisveen and pushed Øien hard to come back with the hierarchical alternative in time to treat the bill in the spring-session. In that case, the proposition needed to be finished before Easter. Time was short and the process became speeded up. The political game had become twisted around the issue of timing.

Politically, AP and SV were in minority, but the government had a basic agreement in parliament also with SP, which secured a necessary majority if and when needed. But in this case, SP and its member in the energy and industry committee Ole Gabriel Ueland, was highly ambiguous to the centralization approach. Support from KrF was also quite uncertain. Høyre and FrP had clearly turned against the hierarchical reform and argued for market oriented approaches. Also within the AP, there was an obvious split between the “modernists” and the “traditionalists”, but the latter had apparently been able to settle the issue internally. The solution open to Arne Øien, was to ask Tveitereid and Høisveen to come up with a compromise – a

¹³¹ Høisveen was also a member of the governance committee for the market reform project at SAF

¹³² Barth Jacobsen, 1998:167. Interview with Arne Øien

proposal which included elements from both alternatives, but which fundamentally met the demands from Opseth and the AP-group in parliament.¹³³

The new bill¹³⁴ was presented on April 28th – one month in delay. One can only speculate whether the delay was just accidental. Tveitereid rejects that the ministry caused the delay, but admits that they had long and difficult discussion – with Vinjar, Diesen and Storstein Pedersen in NVE and with the FD – on how to proceed.¹³⁵ Whatever the reason, the effect was that the report from SAF had been presented to the FD/OED before the proposition from the government was presented to parliament. There was accordingly a basis on which the opposition could ask the government to present alternative solutions. The choice open to the market reform collective was obviously one between trying to strike a real compromise within the hierarchical restructuring collective, or to maintain the proposition mainly in line with the hierarchical alternative in order for the opposition in parliament to oppose to it and to ask for alternative solutions and thereby turn the conflict over to the parliament. Despite Øien's demand for a compromise solution, it seems to me that what happened was in accordance to the second alternative; to present something rather closely in line with the hierarchical approach at a point in time where it was neither too late to become obstructive nor too soon for the market reform alternative to be available as an operational alternative. A reason for this might have been that the hierarchical restructuring program had already been substantially modified by the cooperative collective during the negotiations within the Energy Law Commission and that a compromise with yet another program would have reduced the hierarchical restructuring approach to nearly nothing.

Whatever strategies involved, this was obviously a critical point in the rivalry between the two programs, where the outcome still appeared to be completely open. If anything, the hierarchical collective held the upper hand at this point of time. The AP and the LO had reached agreement internally to go for the hierarchical reform. The AP modernists appeared to have no chance to change the power relations in the short run and the government appeared to be fairly powerless - unable to direct the party organization at this point.

¹³³ Barth Jacobsen, 1998:167. Interview with Arne Øien

¹³⁴ Odelstingsproposisjon nr. 73 (1988-89)

¹³⁵ Barth Jacobsen, 1998:170

However, in parliament, the Høyre representatives argued strongly against a political treatment of the proposition in the spring-session, and received support from a majority represented by all parties except AP and SV. Time was said to be too short to treat the complicated issues involved¹³⁶. Formulations presented about vertical integration based on counties and the suggested paragraphs which would provide new state powers to force local companies to merge, were obviously highly controversial – not at least to SP representatives who were closely involved with the cooperative program. Given the delay, it became politically impossible to force a treatment of the new law before the summer. The government had to withdraw it and to return it to parliament in the beginning of the autumn-session in October – right after the election.

The market oriented part of the political opposition was obviously well informed about the market reform alternative. It was freely available in the form of Hope's report, which outlined an alternative system and presented the arguments from the economists for a market system as well as their arguments against the vertical integration alternative from the point of view of a market system. The game thereby became dependent on the parliament election.

12.2 Mobilizing the market reform alternative within the electricity sector

The hierarchical proposition from the OED fuelled opposition from the local cooperative collectives across the country directed against the proposed new powers of the state to directly interfere into local affairs. Just like in the case of the first national plan presented in 1922, local interests defended their institutional positions furiously.

The mobilization by the local cooperatives turned the market reform alternative into focus within the sector. A substantial demand for information about the market alternative rose. In particular the large "Energy summit" in Trondhjem in September – a traditional yearly meeting where the "entire sector" participate, turned out to demonstrate a substantial support for the market reform alternative.

"There was a substantial interest in my arguments and positive response from many of the speakers at the meeting. The atmosphere was absolutely positive. This was because my arguments could be

¹³⁶ Innst. O.nr.93 (1988-89):1

used against integration. Vinjar spoke after me and started by saying that now he ought to have had a bullet-proof shield in front of him.”¹³⁷

In particular the younger generation expressed their support¹³⁸ – many of them representing distribution companies who wanted to avoid being locked-in by a single regional electricity generator in order to purchase at the lowest possible price. The younger generation was also substantially influenced by the radical market reorientation during the 1980s and some had already been engaged in “modernizing” their electricity companies by applying concepts adopted from business organization and strategy literature and from business advisory consultants.

Among the senior supporters was the leader of the NEVF¹³⁹ and chairman of Oslo Lysverker, Arne Finstad, who had initiated a business oriented reorganization process within his own company from 1987. Also Jon Tveit from Bærum Energiverk was an early spokesman. The wave of new public management had truly reached some of the public electricity companies. These quickly adopted the ideas presented by Hope and became market reform “allies” within the sector.

Through out the autumn, Hope and his colleagues traveled across the country and presented the market reform alternative to numerous electricity companies and their political board members. Even though the ideas presented were new, the new system was to a large extent based on the existing power exchange market. There was also not much which appeared to really challenge the established power relations within the sector. Property rights should not be touched upon and nothing indicated that Samkjøringen should not continue to operate the power pool system. The extension of the common carrier principle from the high voltage national grid system to all the regional electricity networks appeared also not to be a major problem. The principle was well known, and the sector was rather proud of its historically unique internal market system. One could also argue that the usual stochastic variation in precipitation within the hydro-power system played their own important role, as both 1988 and 1989 were wet and mild years with substantial net export at low prices to Denmark and Sweden.

¹³⁷ Interview with Einar Hope, 20.11.98.

¹³⁸ Interview with Einar Hope, 20.11.98.

¹³⁹ Norske elektrisitetsverkers forening

Table 12.1. Production surpluses in GWh, 1985 – 1990.

	<i>Expected operational production capacity pr. 01.01</i>	<i>Production</i>	<i>Gross consumption</i>	<i>Net export</i>
1985	99 696	103 292	102 748	544
1986	101 894	97 284	99 316	- 2 032
1987	102 716	104 283	103 946	337
1988	105 108	110 019	104 391	5 628
1989	105 578	119 197	104 345	14 852
1990	107 816	121 848	105 941	15 907

Source: Central Statistical Bureau (SSB), *Historical Statistics*, 1992

The immediate outlook for economic gains to distributors and consumers from a market deregulation would certainly have been different in 1986 than in 1989. From the point of view of generators in net surplus capacity situations, the outlook was of course the opposite. As a result, the profit argument suggested support from those in net purchasing position to the market alternative.

Through the information and enrollment activity, much of the cooperative sector came to be associated with the market reform – in agreement or for tactical reasons – during the autumn of 1989, and started sending “signals” through their political networks. And “competition” and “natural monopoly” gradually came to dominate the vocabulary through out sector discussions.

The presentation of a market alternative led to internal work within NEVF to work out their position on the subject, which resulted in a report which supported a market based system in a more moderate form. The market should not be open to small and medium sized consumers. In effect, they argued for an extension of the established internal market system for generators to include distributors and large consumers. The report also argued for a period of transition before competition was to become efficient¹⁴⁰. These activities indicate that support for the market reform was not unconditional, but that major sector-managerial interests saw it as a powerful contribution to the undermining of the hierarchical restructuring

¹⁴⁰ Thue, 1996:105

reform in parliament, and expected that the market reform could be modified and adjusted through the political process.

The confrontation within the sector between the two alternatives, the guarantee not to touch local property rights by the market reform alternative, the presence of a growing number of market- and new public management oriented managers within the sector and the substantial work carried out to present the market reform alternative and to enroll and mobilize support for it, shifted the situation towards the market reform side. At this point of time, the situation appeared still to be open. Unexpected events, new initiatives or new arguments could have turned the situation either way. In Hope's words:

"It was a fragile process which could have gone wrong for a number of reasons." (Hope, 20.11.98)

Another organization which played an important role as a supporter of a market based system, was Energidata in Trondhjem and its two managers Oddbjørn Fredriksen and Bjørnar Otterstad. These had long experience with the electricity sector as providers of statistical analysis and independent judgements to the OED and to Samkjøringen. In September 1988, they presented a report to the OED which argued that there would be a substantial over-capacity within the electricity system well into the 1990s and argued that the separation between the occasional and the firm power markets should be dissolved. There should be a market also for firm power.¹⁴¹ These arguments undermined the credibility of the forecasts presented by NVE and Statkraft which argued for the construction of new large gas-turbines in order to meet immediate market demands, and thereby also further undermined beliefs within the OED in the ability of the central planners to govern and control investments. Energidata also presented their ideas around the sector.

12.3 The legislative breakthrough for the market reform

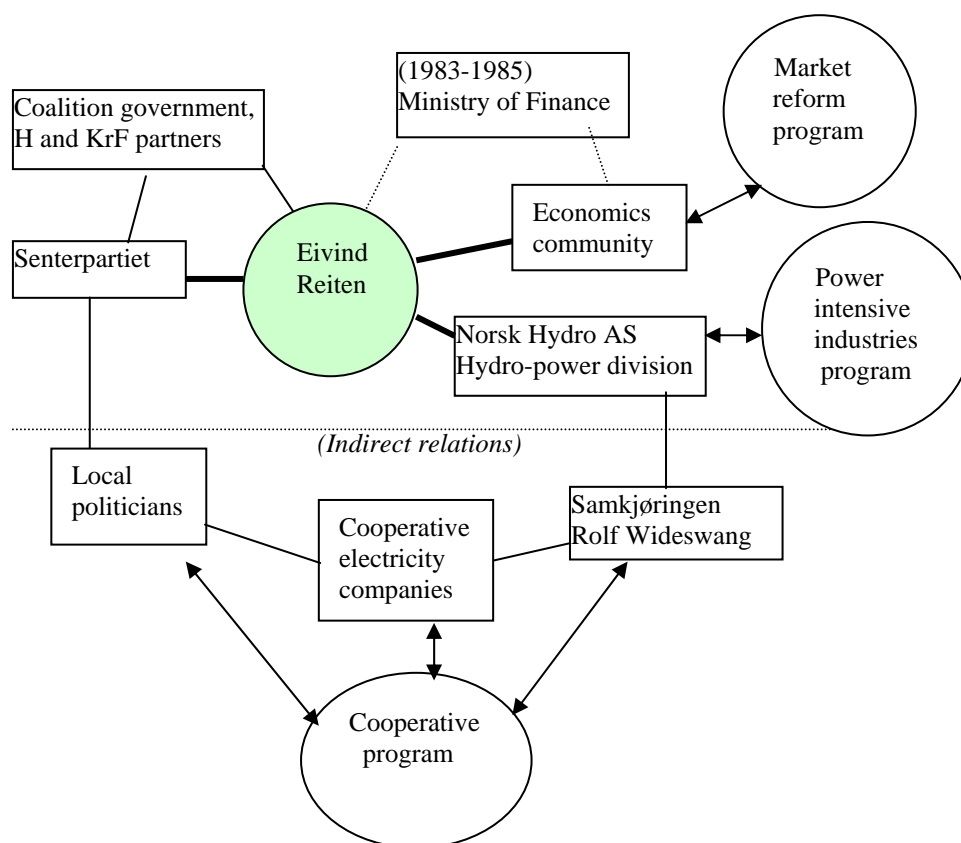
The 1989 parliamentary election led to a shift in government to another Conservative/Christian Democratic/Center (H-KrF-SP) coalition with Jan P. Syse (H) as the prime minister. The new government took over on October 16th 1989 and remained in power only until November 4th 1990. Already on October 20th the new government withdrew the AP Energy Law Proposition. The new Minister of Petroleum and Energy, the economist Eivind Reiten,

¹⁴¹ Interview with O. Fredriksen by Barth Jacobsen, 1998:163

came to play an important role in the further political process. He represented SP – the political bridgehead of the cooperative program with strong links to a number of local cooperative actor-networks.

Eivind Reiten also enters our story from a couple of other positions. From being the chairman of the SP youth party organization in the late 1970s and the secretary for the SP group in parliament from 1981 to 1983, he entered the FD as a vice-minister from 1983 to 1985 during the credit market reform period. Then, he became appointed Minister of Fisheries, a position he held until AP took over in 1986. He then went to Norsk Hydro, where he in 1988 became director for the hydro-power division of the county's second largest electricity generator, as well as perhaps the most competent opponent to Statkraftverkene within Samkjøringen. Being an educated economist as well as a participant in several public debates over the electricity and the power intensive industries, he was also closely associated with the economics community. Below, I have outlined some of the major actor-networks associated with Eivind Reiten.

Figure 12.2. Major relations in “the Eivind Reiten actor-network”



Bold lines indicate the main links, where as double arrows indicate association with some specific collective in our discussion.

Through the role of Eivind Reiten – in person – major elements in the cooperative program and in the large scale power intensive industry came to be collected and associated with the market reform program in a very direct sense. It would be hard to think of a more appropriate person from the point of view of the market reform collective, to secure the alliance with the power intensive industry on the one hand and to consolidate a political alliance with the cooperative collective on the other.

Bjørn Barth Jacobsen refers to Tveitereid, who argues that Reiten was in doubt about whether or not he should withdrew the AP hierarchical reform proposal. This, I find rather unlikely from what we know about his strategic

position. We have already seen that Eivind Reiten in 1987-88 argued that the energy intensive industry in the future would rather prefer to negotiate electricity prices in the market than in the parliament. Norsk Hydro obviously supported the market alternative, and Reiten from his experiences from FD and the government in the first half of the 1980s, had been an important contributor to this strategic shift. It seems to me that there must have been a clear consensus at least among the most dominant members of the government, that the government would support nothing but the market alternative, and that Reiten knew very well what he had to do.

Reiten's association with Norsk Hydro pointed at a couple of other positions. If prices were to be set in the market as a consequence of the inability to secure low prices politically in the future, the industry also wanted direct access to the international electricity market. This position clearly turned industry interests against the monopoly of Statkraftverkene in foreign electricity trade. The other link from Norsk Hydro was the one to Samkjøringen. The 51% state owned industrial company had since the late 1920's, when the initial Samkjøringen organization became established, represented a major opponent towards NVE and a dominant direct role of the state directorate in the electricity sector. The company was probably the most influential actor within Samkjøringen, with substantial international business experience, a market oriented management and business organization and a highly qualified staff of economists and engineers.

Also through his SP-network, Reiten had strong links to Samkjøringen which represented the core institution in a national cooperative governance system within the sector based on federative "bottom-up" principles, and to the local cooperative networks into which the party was closely affiliated through their municipal strongholds.

What can be derived from his network position is firstly, that Reiten as a representative of Norsk Hydro strongly supported the market alternative and the abolishment of the foreign trade monopoly. Secondly, that he supported the idea that Samkjøringen rather than some state institution should operate the national grid system and the power pool, and thirdly, that by appointing him as the minister of petroleum and energy, one obvious purpose must have been to secure the link between the ambiguous SP and the market reform alternative in order to ensure a majority vote for the reform in parliament.

Just 5 months after it gained power - on March 30th 1990, the coalition government approved and presented a new legislative proposition to parliament based on the market reform alternative. The parliamentary election and the shift of government had turned the situation upside down. Now, the hierarchical restructuring alternative appeared to be the lost case.

12.3.1 The administrative process

When Eivind Reiten arrived in the OED, much of the job had already been done.

“Quite a lot was done by Tveitereid when I came to OED in 1989 – and we withdraw Øien’s proposition. There had been a nice cooperation between FD with Hermansen and Sundberg. The administration was closely coordinated in both ministries. That Øien as a minister of energy had got Tveitereid over to OED, was a very decisive move.”¹⁴²

This remark from Reiten clearly confirms the importance of the Hermansen market reform network as well as the strategic importance of the moving of Tveitereid to OED for the ability to switch to the market reform program.

What happened next, was that Reiten decided to close down the Waterfall- and energy-supply department in the OED, which he saw as a bottleneck in the process¹⁴³. With this move, all offices which related directly to the electricity sector became organized under Tveitereid’s energy department, which moved rapidly to organize and coordinate groups of experts from within the ministry, SAF and NVE, to work out practical and legislative solutions for the new market governance system. New ideas such as the area concession system for transmission and distribution activities and the point tariff system suggested by a couple of Statkraft economists, were included.

There was opposition from the hierarchical actor-network of course, for instance represented by Vinjar¹⁴⁴, who opposed strongly to the new market system and in particular to the idea that Samkjøringen should be responsible for the operation of the national grid system. Also Statkraftverkene opposed strongly – in particular to the need for a separation of the company and to the suggestion to end the state monopoly foreign trade regime. These points of view however, appear to have had no significant impact on the outcome,

¹⁴² Interview with Eivind Reiten by Barth Jacobsen, Barth Jacobsen, 1998:188. My translation.

¹⁴³ Thue, 1996:107

¹⁴⁴ Barth Jacobsen: 1998:188 (NVE notat 28.02.90 by Vinjar)

and the new legislation was entirely consistent with the ideas presented in the 1989 SAF report.

The law presented the basic principals for the new market system. The actual restructuring of the state institutions involved in the electricity system, was to be treated later. As we have seen, a separate process directly related to a possible restructuring of Statkraftverkene had been initiated by Høyre in 1988. The administrative process which aimed at providing an answer to the parliament on this issue, had been in control of Gunnar Vatten and the hierarchical restructuring collective – supported by Hveding. Given these circumstances, little more than the basic principles were laid down in the law. A separate proposition was to be presented later about the re-organization of Statkraftverkene. With Reiten, Tveitereid and Hermansen in administrative control however, the SAF economists gained the initiative in a very intense struggle yet to come over the future of the state company.

12.3.2 The political decision process

The next challenge was to get the reform through parliament. This involved negotiations with the coalition parties in parliament as well as with FrP on which the minority government was dependent for support. Gunnar Berge had taken over as the leader of the AP parliament group and Kjell Opseth had been moved from the energy and industry committee.

With the party leadership back in parliament, its ability to direct party representatives obviously improved. With Gro Harlem Brundtland and Gunnar Berge in parliament, AP would probably not have obstructed the new energy law. As it turned out, it was not necessary to demonstrate this shift, as Reiten and the government managed to convince the somewhat reluctant SP representatives in parliament to support the market reform. Even though opposition to the competitive market ideology was fairly strong within the SP on behalf of the cooperative program, and despite the fact that Reiten had to push the “not to touch property rights guarantee” argument to truly convince his party colleagues, it appears to have been no real doubts regarding where the party had to go. A turning of the SP against its own dedicated minister on this issue, would have been quite a surprise. When forced to choose between the market which would maintain local autonomy and a state oriented hierarchical restructuring alternative, the party had to go for the market. But there for sure had to be some play for the gallery.

Interesting to note here, is that the alliance between the cooperative SP and the market oriented right wing parties on the market reform, was not an unsacred tactical alliance, but also followed from the interests of Norsk Hydro and Samkjøringen mediated through Eivind Reiten in person – largely

in opposition to a trading system dominated by Statkraft. This was an important underlying conflict which in part mobilized the SP to engage in securing the market reform – in addition to it strive to maintain local autonomy and federative organizational structures within the industry.

It is also quite interesting to note the very striking difference between the reform approach of the 1922 national plan and the 1989 market reform. Contrary to in 1922, the process – for various largely pragmatic or accidental reasons – had been separated into different sub-processes. In this way, several controversial points were postponed - like for instance the conflict between Statkraft and Samkjøringen over who was to have the future responsibility for the power pool system and the physical balancing of the electricity network, as well as the traditional controversy over the electricity contracts to energy intensive industries. Nor were tax issues addressed. In this respect, the political process was completely opposite to the 1922 hierarchical reform process which collapsed because it pushed a very broad specter of changes through its complete, simultaneous reform approach. The radical market reform got implemented through a sequential process which permitted for broad alliances over time, where the different elements of the reform program could be mobilized to create allies needed to win the various “local battles”. No doubt, also the complex integration of different rival programs into the market reform program, provided a useful basis for the transformation of quite different opponents.

The energy and industry committee in parliament was still divided on several issues. There was a majority of 8 which contained the government parties SP, KrF and Høyre and the right wing FrP, and a minority of 7 from AP(6) and SV(1). But also the minority supported much of the suggested reforms. The divide was primarily over the export regime, where the majority suggested that the Statkraft monopoly should be replaced by a “Committee for power negotiations” in line with a similar committee within the gas export regime, where as the minority supported a continued Statkraft monopoly. As a second best option, they could accept a compromise suggested by KrF where Statkraft as the operational entity coordinated export negotiations on behalf of other generators within the frameworks of a joint export committee.

The support for vertical integration by the minority had been reduced to little more than oral statements and play for the gallery. The hierarchical program had lost the battle over the new energy legislation. What remained was simple formalities.

In November 1990, just before the final voting over the new energy law, the government coalition broke down and a new Brundtland government

returned to power based on political support in parliament from SP and SV. The new government neither would nor could stop the process and the law obtained a conclusive majority support. Through the short inter-mediation with the coalition government, the AP leadership had probably got the reform which it had wanted but not been able to convince its own party about, as well as a large scale radical reform by which to demonstrate the policy of the modern social democratic party; “more markets – more governance”.¹⁴⁵

12.4 How can the breakthrough for the radical reform program be explained?

With the new energy law implemented from January 1st 1991, the market reform reached a decisive breakthrough into its becoming a stabilized real world phenomenon – nearly nine years after Einar Hope presented his electricity market research program in 1982. Norway had thereby established a market oriented legislation for its electricity sector which was to become an international forerunner along with the British reform, the only area of market deregulation in which Norway played a significant innovative role by any international comparison.

Strikingly similar to the Morgan versus Edison case, the process appeared to have been relatively open between two major alternatives. In the end, what decided upon the breakthrough was an external event; the 1989 parliamentary election which brought a coalition government to power. In this perspective, elements of chance – or at least influences from events over which the rival collectives had no overview and control – were certainly important. On the other hand, the outcome was obviously a result of the strategic networking activities of the market reform collective, the aggregation of scientific and state administrative powers gathered behind it, the strategic modifications of the program so as to become adjusted to the strong national resource control program historically locked into the sector as well as to the institutionally powerful local cooperatives. In the end this provided for the crucial alliance between the market reform collective and the cooperative collective against the hierarchical restructuring collective in the legislative process. Less decisive perhaps, the large scale industry dominated by Norsk Hydro supported the market alternative, where as the system design oriented engineers who favored a solution which left a

¹⁴⁵ For a more extended presentation and discussion of the arguments in parliament, see Thue, 1996 and Barth Jacobsen, 1998.

significant role to hierarchical planning and control – in essence a strong role for NVE and Statkraft and a more restricted role for the market, faced a relative defeat.

The outcome can also be seen as resulting from strategic actions taken at the frontline of rivalry between the two major actors, which focussed on gaining support from within the sector as well as from political actors capable of pushing the case. Control with the timing of the process turned out to be a significant variable which first forced the market collective to radically speed up the construction of a convincing representation of their alternative system, and then forced the hierarchical restructuring collective into a defeat through the postponing of the legislative process from the spring to the autumn by the opposition majority in parliament. But also the “sales work” done by Hope and his colleagues through out the sector was probably important in gaining sufficient momentum behind the political rejection of the hierarchical restructuring reform initiative.

In the wider context of the broad market reorientation in the 1980s, the breakthrough linked on-going change processes within the sector to a conceptually consistent system for the entire industry in which the framing of these on-going projects fitted in. Also the over-capacity problems in the 1980s which caused continuous large price differences between firm power contracts and prices in the occasional power market, prepared the ground for an increased role of the market, by demonstrating possible economic gains to distribution companies and consumers from an expanded role of the market.

In the broad picture, the breakthrough became possible because of the unresolved rivalry between an institutionally locked-in cooperative program and a state oriented entrepreneurial hierarchical restructuring program, and because Hveding and his system design collective based on the electricity economics developed at EdF, failed to make a convincing breakthrough in the 1970s which would have permitted this collective to re-shape the industry in more significant ways. In part this failure had to do with its lack of unconditional support from the Norwegian economics community. However, both the introduction of electricity economics, the occasional power market and the cable to Denmark, all introduced by the Hveding collective, became crucial preconditions for the emergence of the market reform alternative in Norway. Without these structural circumstances, it is hard to see how a market system could have been advanced and put to practice.

This situation with rival as well as unsuccessful attempts at reforms which all had the objective of improving economic efficiency and organizational rationality within the electricity sector in some way or another, left the field

open to some other alternative with a more substantial scientific authority behind it and with a capacity to established alliances with powerful locked-in collectives.

It became a reality because Einar Hope and his colleagues at NHH/SAF were able to fill this open field, by pushing the early research activities on the occasional power market further into a viable system alternative based on fundamental concepts within economics, and because Tormod Hermansen - in part by chance – was appointed to a state-administrative position from where he was able to push this alternative into an operational reform program which represented a political alternative, and to orchestrate the many networking activities involved. The market reform in this sense, became a legislative reality due to lots of work within different related actor-networks which produced the many elements needed and linked them together in accordance with a simplified, powerful re-framing of the entire electricity sector.

On this background, one may also conclude that it became possible to radically change an industry characterized by strong lock-ins in part because the authority of its historical collectives had been weakened by political changes and economic problems in the 1970s. In part it became possible because the “radical” market reform had been adjusted to important locked in structures so as not to appear that challenging or radical. In part it became possible due to the sequential character of the process in which a number of controversial issues were not addressed during the legislative process, but rather after the market reform collective had gained additional institutional powers. I also think that it became possible due to the relatively “irrational” character of the decision process in which there was no room for detailed evaluations of possible consequences for different types of actors, or for other aspects of the system, which might have stimulated substantial counter forces (anti-acts). One may even conclude that it became possible due to a strategic and rapid “coup” by well organized actors with substantial scientific and political authority which left opponents without a well organized defense.

Finally we may also note the specific role of economic efficiency in this process. Economic efficiency played a major role in all the different entrepreneurial collectives which set out to reshape the electricity industry since 1960 – except the environmental. But it played two very distinct roles. One is associated with the purpose of the future and the other has to do with the real life testing of collectives/systems which have managed to become stabilized. In the rivalry situation over alternative reform programs, efficiency as a purpose of the future apparently plays a very crucial role, where as the demonstration of immediate economic success is largely

irrelevant. The ability to mobilize persuasive arguments and authority behind some specific approach to efficiency improvements, becomes the completely crucial issue, as both the capturing of commanding heights and political decision processes depends on the relative persuasiveness of different alternatives. This is in essence why economics as a scientific discipline plays such a tremendously powerful role in reshaping of industry processes. And that is why the absence of unconditional support from the relevant economics community may be so devastating to reform initiatives of this kind, where as other areas of science that are not in particular concerned with economic efficiency, are found to be more or less irrelevant to the game. The success of the market reform in creating such a breakthrough, and the striking effectiveness of its reshaping of the sector afterwards despite major up-front compromises, can accordingly be traced back to its roots in economics and the economics community itself.

However, with the approval of the new energy law in parliament, there was still no real life competitive market with the industrial and organizational structures, characteristics and systems prescribed in the 1989 SAF report. The law was only another step forward to a stabilized marked system. In the next chapter, I will follow some of those projects and processes initiated by the market reform collective in the wake of the new legislation, which aimed at both a re-configuration of the industry and a re-formatting of its economic agencies – as suggested by Einar Hope.

13 Shaping and stabilizing a market system and its economic agencies

With the new legislation, the market reform program had become institutionalized as the policy of the state and thereby obtained support by the institutional powers, the authority and the resources of the state apparatus. But there was still no real competitive market with “rationally calculating profit-maximizing actors” to be observed. To actually transform the sector, its economic agencies and its agents was the challenging task which confronted those who were involved in the reform project after the energy law had received a majority support in parliament. Just like the legislative process, I find that this transformation process in many ways was still uncertain and open, and that it crucially depended upon the collective of actors, institutions, organizations and trusted delegates which mobilized for the making of a market system through a large number of operational reform projects. It could have met severe political setbacks, obstructions or efforts to undermine its authority from rival programs. It could also have met ignorance, institutional constraints, economic crisis or even technical problems which would have prevented the market program from reaching a stabilized position. It was indeed still a large scale experiment governed by economic theory, economists and state administrators. But it also became supported and advanced by various other types of actors who entered the sector - as business consultants, investors, traders, brokers, educational institutions etc.

Two severe instances of economic turmoil nearly caused political interventions to constrain the new market system by changing the legislation, by altering conditions in electricity contracts administratively, or even to abolish the market system altogether. Basically, these resulted from shifting weather conditions, and as such represented a “testing” of the capability of the new system to “manage” the large stochastic variation in production capacity in the hydro-power system. The situation year by year from 1990 through 1996 is shown in table 13.1. below.

Table 13.1. Variation in production, consumption and net-export in GWh, 1990-1996

	<i>Expected operational production capacity, pr. 01.01</i>	<i>Production</i>	<i>Gross consumption</i>	<i>Net. export</i>
<i>1990</i>	107 816	121 848	105 941	15 907
<i>1991</i>	108 083	111 009	108 236	2 775
<i>1992</i>	108 083	117 503	108 777	8 729
<i>1993</i>	109 457	120 096	112 196	7 899
<i>1994</i>	109 635	113 213	113 082	132
<i>1995</i>	111 850	123 017	116 349	6 662
<i>1996</i>	112 348	104 712	113 688	- 8 976

Source, Central Statistical Bureau (SSB), Electricity Statistics, 1996

The first instance occurred in the autumn 1992 after a period of very low spot-market prices due to the established over-capacity combined with a wet and mild winter (which on the other hand was not as extreme as in 1990). The emerging competition when distributors and consumers could choose to buy spot rather than fixed contracts however, pushed contract prices as well as contract periods substantially down and forced or induced generators to re-negotiate existing long term contracts with distributors and large consumers. This triggered political initiatives from generators who nearly succeeded in gaining sufficient political support in parliament for a legislative intervention. In October 1992 the AP government suggested to constrain access to the market for small and medium sized consumers (less than 2MW capacity or 5 GWh yearly consumption) by forcing these to take contracts with at least 5 years duration¹⁴⁶. This would have introduced a fairly long transition period like the one established in the UK. Even though there was in fact a majority in parliament for some level of intervention, none of the suggested proposals obtained a majority vote.

Already in April 1992 the government had suggested to change the export regime due to expected over-capacity. The industry obtained a license to export 4 TWh on fixed contracts for 5 years, which was later increased to 5

¹⁴⁶ Ot.prop. 11, 1992-93

TWh for 6 years (1993-1998)¹⁴⁷. This, of course, had a similar but less discriminate effect on prices.

The second incident occurred in the both very dry and cold autumn and winter of 1996/97 when production shortage resulted in substantial import at high prices. As a result, consumer prices increased radically to meet the resulting energy capacity shortage and thereby provoked political initiatives on the consumer side to abolish the new market system. The incident led NVE to work out alternative administrative systems to increase security of supply and ration consumption, which however were not implemented.

In both cases, the new market system survived and thereby further stabilized its position as a robust, flexible and manageable system also under relatively extreme opposite weather conditions.

Also the rivalry with the hierarchical program continued – in particular in relation to the restructuring of Statkraft issue, where Hope had suggested to split the company both between generating and transmission activities and internally between different generating divisions. These ideas met strong opposition from the state company and its director Gunnar Vatten. Later on, traditional regional hierarchical interests also regained momentum and mobilized to integrate counties and larger regions through cooperative arrangements and through mergers and acquisitions, and thereby reduced the number of independent suppliers in the market. From the traditional cooperative electricity companies, the market reformers met less ambitious, but more defensive and protective attitudes associated with opposition against capital ownership and profit-maximizing as the major objective for the electricity company rather than for instance minimization of consumer prices.

On the other hand, the now radically increased powers and credibility of the market reform program, obviously had the effect that actors on the outside of the market reform collective to a much larger degree wanted to get on the inside. This was in particular true for electricity company managers. Many started or intensified education of staff members in economic theory, finance, business organization and marketing. They recruited business educated and experienced employees and initiated organizational changes to adopt to the demands of the new competitive situation. Courses and seminars prospered. There was in many respects an open, interested, expectant and loyal - even eager - attitude among sector practitioners towards the new

¹⁴⁷ St.prop. 81, 1991-92

regime which meant that the sector transformation process also came to be driven from a variety of local initiatives hardly overlooked by anyone. Adding to this, a number of new, market oriented actors like trader- and broker-companies were invited into and entered the sector. Many of those were created by experienced employees within the electricity sector who left their jobs to explore new business opportunities. These came to serve as important representatives of the market reform program who triggered local breakthroughs for competitive behaviors, expanded trade in the organized exchange market and developed organizational models for efficient trade management which became adopted by many of the publicly owned companies after a while¹⁴⁸. Other important roles were played by the business consulting industry, which became engaged by public electricity companies to give advice on how to organize more business oriented companies.

No doubt however, the commanding height and major force in the continued making of the new market system was still represented by the state-economist alliance, who initiated a number of reforms in order to implement and further develop the SAF program. In 1991 Tormod Hermansen left the FD to take on a new job as the CEO of the state owned telecom company Telenor. Einar Hope also devoted himself mainly to a different task, namely the new competition law to which he became a major scientific contributor. From 1995, he took over as the director of the Norwegian competition authority, from where he came to influence the restructuring of the electricity sector from a state administrative position. The responsibility for the further work on the electricity market reform had largely been delegated to Siggurd Tveitereid and his staff in the OED – and to SAF economists with specialized competencies.

In the 1989 SAF report, the following five elements had been identified as essential to the restructuring of the industry in the new market system:

- 1) The market institution “Kraftsentralen AS”, which implicitly addressed the organization of Samkjøringen.
- 2) The national transmission company “Transkraft AS”, which addressed the division of Statkraft into two functionally separated companies.
- 3) The reorganization of the distribution companies, which addressed the separation of electricity supply from network distribution and the

¹⁴⁸ In particular companies like Norgeskraft AS, Scankraft AS and Norsk Kraftmeglig AS became important formative sources

“formatting” of public electricity companies to become “rational economic agencies”.

- 4) The redefinition of the role of Statkraft in the power market, which addressed market power, regulatory services, international trade and the “formatting” of Statkraft as a “rational economic agency”.
- 5) Regulation and governance, which addressed the need to establish appropriate economic regulatory institutions - and thereby the role of NVE, and the need for regulation and control systems based on economic principles.

These issues represented the point of departure for a flow of reform projects which step by step re-structured and re-formatted the electricity sector, its organizations and its actors. One reform focused on the reorganization of NVE, a second on the reorganization of Statkraft, a third on the organization of the power exchange institution (Samkjøringen) and the foreign trade system, a fourth on accounting and tariff reforms, a fifth on natural monopoly regulations, etc. etc. Below I have listed some of the major projects and reform efforts carried out in between 1991 and 1997.

- 1) Reorganization of NVE
- 2) Division of Statkraft and establishing of a national grid company
- 3) Re-structuring and re-formatting the power pool and the electricity trade systems
- 4) Accounting reform and unbundling of market and monopoly activities
- 5) Tariff system reform
- 6) Trade concession reform
- 7) Monopoly regulation and control system reforms
- 8) Reorganizing international electricity trade
- 9) Structural reform of electricity network system
- 10) Regulating organizational changes in electricity companies
- 11) Electricity sector tax reform
- 12) Expansion of market to include other countries

In the following I will discuss some of these projects a bit more closely. First, we shall have a look at the re-shaping of the core institutions NVE, Statkraft and Samkjøringen and at two different system reforms; the

accounting reform and the point tariff and third party access reform. Then, I will discuss efforts by the market reform collective to shape market competition as well as the organizational structures of local and regional power companies in accordance with the economic theory of the market program. Finally, I will present and discuss various initiatives and approaches to shape of the market infrastructure monopoly control system; the electricity network “natural monopoly” system.

13.1 Re-configuring and re-formatting the basic structure of the industry

On the basis of the re-framing of the industry offered by the 1989 SAF report and the new legislation, the market reform collective quickly moved to re-configure the industry and to shape the basic infrastructure and the measurement, regulation and control systems. The first target was the state regulatory institution – the new role of the NVE.

13.1.1 The re-structuring and re-formatting of the NVE

In the wake of the 1986 separation of Statkraftverkene, the NVE had been reduced into what was commonly denoted “the rest of NVE”. Both its largest activities and much of its most competent staff had been transferred to Statkraft, and the politically powerful board of the NVE had been reduced to an advisory committee. Furthermore, the FD under the Hermansen leadership, repeatedly pushed for further cut backs in staffing and funding based on the argument that the period of rapid expansion of production capacity had come to an end. The NVE general director from 1987, Erling Diesen, during his three first years in office accordingly struggled to hold on to resources and competent staff members in a situation with threatening dissolution of the powers previously associated with the directorate.

Based on a report from an inter-ministerial working group in March 1990¹⁴⁹, the government in May 1990 presented a plan to reorganize NVE into one directorate with six different departments, of which the important newcomer was the energy saving and market department. It also suggested in line with FD arguments, to reduce the remaining staff of 400 to approximately 325 by

¹⁴⁹ “Norges Vassdrags’ og Energiverk. Framtidige oppgaver, organisasjon og bemanning”, OED rapport, 1. mars 1990.

the end of the year 1991¹⁵⁰. The reorganization was approved by parliament in June 1990.

It was accordingly a severely “squeezed” general director Diesen who by the OED became involved with the preparations for a market oriented legislative reform and who was suggested to take on an important new role for the NVE within the new competitive market system; as the market system regulator with substantial responsibilities and powers to direct the further transformation of the sector and to regulate the “natural monopoly” infrastructure system in particular. To Diesen, who for two decades had exposed himself as one of the most prominent supporters of the hierarchical program, to take on such a role would apparently imply a fairly radical shift to the rival market program. On the other hand, as we have seen, the new role of the NVE corresponded in important ways with the hierarchical restructuring program; it constituted a center for industrial restructuring, formative initiatives and hierarchical regulation and control of sector activities. Even though the basic framing was different, the role of the state institution was quite similar and its powers to carry it out was apparently substantially increased by the adding of the legitimacy and the governance instruments provided by economic theory. The switching distance in this respect was not that large after all, and the restructuring of the NVE was carried out without notable conflict.

The new energy saving and market department within the NVE was to do much of the actual work on the further reform process. As its leader, the OED wanted a well experienced economist with a capacity to push forward reforms based on economic principles and theory. To the job was selected Jan Moen, who became employed as the director of the department in the autumn 1990. He came from a position as a manager at Oslo Lysverker where he had been engaged for a couple of years as part of the company’s ambitious strive to become a more efficient, “modern” and business oriented organization (in the previous non-market regime). He was the one to take on the core networking role in between the NVE and the SAF/SNF, and the one to secure the basis for efficient delegation of responsibilities from the OED to NVE; trust based on professional understanding of and personal commitment to the market reform program. The actual leadership and internal authority in relation to the work on the new electricity market system within NVE accordingly came to rest primarily with Moen rather than Diesen, who however hold the more visual formal responsibility for the broad set of NVE activities and who played an important role in mediating

¹⁵⁰ Stortingsprop. nr. 95 (1989-90)

the market reform towards those who had represented the hierarchical restructuring program as well as towards the general public.

Through this restructuring and reformatting of the NVE, the market reform collective established a basis for delegation of much of the further work towards local and regional electricity companies. The role of Jan Moen, illustrates the important qualitative character of relations which serve as basis for delegations. There has to be a convincing set of program-specific relationships and coherence between the leadership of the collective and the delegate for delegation to be efficient as a basis for expansion of a remaking of society program. Such a thing as for instance an institutional relationship alone, would clearly not do the thing.

The state directorate had become re-configured and re-formatted to serve the new market system. From now on, one of its primary objectives became to influence electricity companies and others within the sector so as to act in accordance with market economic principles¹⁵¹.

13.1.2 The restructuring of Statkraft

The reorganization of Statkraft was presented by the AP government to parliament in a separate parliamentary proposition in May 1991 - one year after the new energy law had been approved¹⁵². As we have seen, the work on this particular issue had its roots also in initiatives taken by Høyre in parliament, which had induced a report by a committee established by the OED in cooperation with Statkraft and its director Gunnar Vatten, which suggested a reorganization of the company into a corporate joint stock company structure. This might be seen as an extension of the proposal put forward by the coalition government in 1985 which had been rejected by the parliament majority after strong opposition from the trade unions and the AP towards the joint stock company form. However, it also outlined Statkraft's ambition to "modernize" its organizational structures while at the same time maintain integrated managerial control over its established multifunctional activities, resources and tasks.

The restructuring of Statkraft issue came to represent a main frontline between the state company and the market reform collective. In a letter from FD to OED dated Sept. 7th, 1990, the FD even suggested to separate the

¹⁵¹ (NVE annual report 1990)

¹⁵² St.prop. 100 (1990-91)

generating part of the company into several autonomous generating companies and to wind up or sell the construction activities¹⁵³.

To Einar Hope, the restructuring of Statkraft issue in several ways represented a cornerstone to the framing of and the efficient functioning of the future market system¹⁵⁴. It was during this conflict that Statkraft engaged SAF researcher professor Finn Førsund at UiO who argued for a continued important role for an integrated hierarchical governance system – in particular in order to maintain short term physical balance in the national grid system. This became an important argument for Statkraft to maintain its unique roles in the system. In response, Hope and his colleagues developed a “regulatory market model” as a market based alternative way of solving the problem – an anti-anti act which provided no privileged role for the state company at all. Statkraft also mobilized substantial resources behind its claim for a continued state control with international electricity trade and thereby a continued role for a large integrated state company to carry out this task.

In August 1990, still under the coalition government and OED-minister Eivind Reiten, the OED informed Statkraft that the ministry wanted a separation of the company into one generating and one transmission company as well as a separation of engineering and construction activities into subsidiaries. The company had to give in at these points and to start preparations for an implementation of the separation of the company from January 1st 1992. Also the argument about a continued state monopoly on international electricity trade was rejected by the ministry, who had received a special report on the issue from a working group with participation from both SAF and Statkraft, which concluded that a continued state monopoly would not be possible within the future EU regime.

The state’s positions on separation of Statkraft and foreign trade were maintained when Finn Kristensen took over from Eivind Reiten as the OED-minister in the new AP government. Statkraft became separated and the state monopoly abolished – apart from the concession system which provided the OED with the authority to approve, reject and regulate long term export contracts. Statkraft S.F.¹⁵⁵ became the state generating company with a

¹⁵³ OED-arkiv 90/3895-9

¹⁵⁴ Interview with Einar Hope

¹⁵⁵ Established on the basis of the new state firm law in 1991 – a result of the work of the Hermansen Committee.

continued responsibility for established state contracts to energy intensive industries. There was no further division of the company – neither in terms of autonomous regional companies nor in terms of internal divisions or subsidiaries.

Statnett S.F. became the national grid company (Transkraft AS) with ownership control over 85% of the national grid system and rental agreements to control and operate the remaining 15% owned by various regional electricity companies and large power intensive industries.

What remained then, was the issue of who was to own and operate the power pool/market institution (Kraftsentralen AS) and to operate the short term physical balancing of the system – tasks which were currently under the formal responsibility of Samkjøringen. The government proposition offered no specific solution to this problem, and suggested to delegate authority to the government to settle the issue.

13.1.3 The state takeover of Samkjøringen and the reshaping of the trade system

Both the SAF and the coalition government supported the idea that the market institution should be owned and operated by the market actors rather than the state. This could be obtained through a restructuring of Samkjøringen into a joint stock company. The new AP government however, took Statkraft's position that operation and balancing of the network system should be coordinated closely with the network owner – the new Statnett S.F. company. No doubt also, basic ideological positions on the role of the state in the economy were important in the controversy.

AP obtained support from the leftist SV party, but controlled no majority in parliament. The party which usually provided the necessary support for the government in parliament; SP, in this case clearly supported the Samkjøringen alternative. The issue was accordingly open and invited substantial lobbying from the parties involved.

The parliamentary debate and voting on this issue turned out to be the only incident of parliamentary drama during the entire market reform process. In the end, the market liberal party FrP fell down on the government's side – apparently because its leader Carl I. Hagen had been provoked by the intensity of the massive lobbying campaign put forward by Samkjøringen

and its members – and chose rather to support a state takeover of the market institution from Samkjøringen¹⁵⁶.

The outcome represented the end of the national cooperative organization which became dissolved thereafter. A new company named Statnett Marked AS was founded as a subsidiary of Statnett S.F., which took over all employees from Samkjøringen except its top management. Associated plants and installations were already owned by Statnett. “Kraftsentralen AS” had thereby also been established as a state owned joint stock company responsible for the power pool and the organized electricity market. The government finally also supported the SAF idea about “the regulatory market for short term balancing of the electricity network and settlement of contracts” as an auction based way of organizing these tasks.

Statkraft lost its foreign trade monopoly, but came to play a dominant role as the largest and most experienced partner in nationally coordinated export and power exchange initiatives in the years to come. It had to accept the basic separation of the company in accordance with the re-framing of the sector put forward by the SAF, but managed to reject further disintegration and finally – after more than 60 years of subordination - managed to overturn Samkjøringen. The outcome of the reform process in this respect came to represent a compromise - an image of the social democratic renewal program with its combination of market orientation and state governance ambitions: “More markets – more state governance”.

The essential change in the trade system from the previous regime to the new market system, was the opening of the internal occasional power market. Anyone who paid the entrance fee of NOK 50.000 a year could now buy and sell electricity and financial contracts at Statnett Marked. There was no attempt at forcing all electricity trade over the organized exchange market – like in the British power pool system¹⁵⁷. The electricity exchange market accordingly contained a spot market which historically had represented less than 10% of the total volume, and the new regulatory market for short term dispatch and settling of contracts for all types of physical contracts¹⁵⁸.

¹⁵⁶ For a more extended presentation of the parliamentary debate, see Barth Jacobsen, 1998, 214 - 220

¹⁵⁷ The British power pool system was in essence an extension of their previous hierarchical national merit order system.

¹⁵⁸ Contracts are set ex ante delivery, where as actual supplies of electricity can only be calculated ex post.

From there, Statnett Marked employees in cooperation with economists at the SNF embarked on developing a futures market with standardized financial contracts in accordance with what had been advocated by Einar Hope. The new futures market became established as a market to market system in which the exchange market institution (Statnett Marked AS) engaged in financial contracts with sellers on the one hand, and buyers on the other. This permitted actors to trade electricity in the form of pure financial contracts with each other on a non-relational basis. Nobody knows who they are actually trading with. What is left to consider for each decision-maker is the quality of the contract in terms of its supply profile, the price and his expectations about future prices and risks. Contracts are settled every day, losses charged and gains distributed.

To operate this specific task, Statnett Marked engaged Norwegian Option Central (NOS), which has a similar responsibility at the Oslo Stock Exchange. The new electricity market thereby became institutionally linked with other organized markets – and thereby to leading expertise on operational exchange market trade systems.

To manage their trading operations, traders and brokers obtained standard financial market computer software based on standard principles and equations in financial theory. Some also initiated innovative projects to model specific risk problems in the hydropower system (for instance Norsk Hydro) and to design types of contracts to deal with these particular problems – like financial “weather contracts” to hedge risks related to unpredictable changes in precipitation to the hydropower system.

Over time, these contractual systems and computer based calculating systems constituted a common technology which made it possible for trained employees to hold track of their complex contract portfolios, to adjust them, to simplify and “standardize” decision-making procedures and to make decisions at a rapid speed. The EFI simulation model came to serve as a technology for price estimates and the NVE - and later on the Competition Authority - forced generators to release hydrological data and data about storage levels to the market on regular intervals.

The futures-contract system got organized in a rolling two year schedule structured into weeks, blocks and seasons which were all priced and traded at the exchange. Week contracts for the near future (8-11 weeks), then blocks and then seasons for the second year. The basic contract is a financial week contract with a flat (base load) delivery profile. One block contains four weeks and one season contains three blocks. As times move on, new seasons are added, seasons are dissolved into blocks and blocks into weeks. A contract can be bought and sold an unlimited number of times before

maturity, which permit actors to design their risk exposures flexibly and continuously.

During 1992 and early 1993, prices in the larger bilateral contract market converged towards the by then lower prices at the organized exchange market. This added substantial tensions among electricity distributors who were locked into high priced long term contractual relationships with regional generators to which the distributor was historically related also through ownership or political relations. By 1994 however, prices increased rapidly due to changed weather conditions, and distributors had to cover their fixed supply obligations with expensive spot market contracts. As a consequence of this turmoil and the economic losses which followed, a market for professional market advice emerged from where broker companies established a basis for a rapidly expanding broker and business advice industry which organized bilateral trade as semi-structured non-relational exchange markets. Gradually, many of the smaller companies out-sourced trading to these companies or created joint trading companies. The “learning curve” across the sector was certainly rather steep during the first 3-4 years of the new market system.

The broker companies were now able to construct new types of contracts – usually with different types of delivery profiles and real options for the buyer in terms of when to execute a given contract. The larger companies – like Statkraft S.F., Oslo Energi AS and BKK BA organized their own trade departments which did similar things. In this way, a competitive market for organized electricity exchanges emerged which forced transaction costs down and spurred organized non-relational trade through different trading systems. This had the effect that even though a substantial share of the electricity market was still based on bilateral contracts, most of these were actually traded between buyers and sellers in a non-social relational way in which only contractual conditions and price mattered. Social, political and organizational relations had indeed become externalized from trade practices at a dramatic scale.

Through the very powerful new role of the organized electricity market and the common technology, organizational forms, theoretical concepts and educational programs embarked on, a fascinating “re-formatting” of electricity companies and their economic actors rapidly spread across the sector. Traditional bilateral trade practices based on various non-economic structures and relationships were broken apart. Electricity companies restructured their trading activities, established departments or subsidiaries or out-sourced their electricity trade to expert companies. Even internal supply from generating departments to market departments within vertically integrated supply companies were broken apart – each department buying

and selling through the market. Gradually, economic organizations and economic actors became structured and formatted in accordance with basic concepts in economics. They became “economically more rational and capable of designing rational economic strategies”, to rephrase Einar Hope’s early critique of the sector.

13.1.4 The expansion of the Norwegian electricity market to Finland and Sweden

From January 1st 1996, Sweden and Finland also deregulated their electricity markets and joined the organized Norwegian electricity market (Finland through Sweden). Svenska Kraftnät bought 50% of the shares in Statnett Marked AS and the company shifted its name to Nord Pool ASA. As its new director was appointed Per Hjort, who came to play an important role in the integrative process with Sweden. He also enforced a further development of the organized trade system – for instance by introducing continuous time computer based trade at the Nord Pool exchange. He also engaged as an advisor to other countries who wanted to establish similar electricity trade institutions. Nord Pool ASA has apparently - by the late 1990s - become perhaps the most important delegate of the market reform collective, engaged in expanding the Nordic market system to the European continent.

With the inclusion of the Swedish market, the number of actors trading in the Nord Pool markets increased substantially, and with the renewed tendencies towards deregulation in Europe, there has been an influx of trading companies from other countries as well who have engaged themselves primarily for learning purposes. Some of the larger European electricity companies have also acquired established broker companies in the Nordic market for similar reasons.

13.1.5 The accounting reform and the role of capital accounting in the formatting of economic agencies

Among the first tasks to be carried out by the OED/NVE during 1991 and 1992, was the accounting reform, which was an integrated part of the market reform proposal presented by the SAF. Accounting in public sector electricity companies at the time followed traditional public sector principles which showed no capital value balance sheet – only costs, revenues, debts and funds. That is, investments in real assets were set at zero value, which of course made it impossible to calculate real economic returns to these investments. Electricity company boards typically aimed at striking some balance between the ambition to reduce consumer prices and the desire to accumulate internal investment and security funds, which essentially corresponds to a standard economic model within cooperative theory which says that the principals of requisite societies optimize consumer surplus plus

company profit in such a way that consumer surplus at the margin is equal to marginal company profit. Which implies that consumer surplus and company profit is equally important (Enke, 1945, Helmerger and Hoos, 1962)

With the accounting reform, everybody had to convert to joint stock company standards, which meant that balance sheets which showed real asset values had to be calculated according to principles and guidelines presented by the NVE. As a basic rule, the historical cost principle should be applied with linear depreciation at various lengths for different types of investments. By January 1st 1993, all electricity companies had established joint stock company accounting systems – disregarding their actual judicial form or their established economic objectives as represented for instance by their board members.

The new energy law did not require companies with both competitive market and monopoly activities to separate into different judicial entities, but it demanded that accounts be separated between activities which belonged to the competitive part of the system; that is electricity generation, trade and supply, and activities defined as the “natural monopoly”; the transmission and distribution part. Each company accordingly had to produce one annual report for each part in which common assets and resources were distributed in accordance with NVE principles and instructions. Furthermore, costs related to different voltage levels in the network system had to be reported separately. The purpose of all this was to establish an economic report system which on the one hand turned capital and capital returns into the focus of the electricity company economic governance system, and on the other hand provided a basis of economic data structured so as to serve as a foundation for state regulation and control systems derived from economic theory. It should in particular provide relevant and reliable data on which the NVE monopoly control of tariffs and network company profits could be established and executed.

As I have noted in my historical presentation of the industry, a large number of electricity companies basically saw themselves as either cooperatives in which governance rights were derived from the consumers, or as public service enterprises in which governance rights derived from the diverse interests of political electors. Even though board members often represented different views, these companies had usually no intention to transfer themselves into enterprises in which capital ownership provided the dominant source of legitimate governance rights and economic beneficiaries. Neither did the market reformers in the state administration embark on any explicit attempt at changing ownership relations or judicial ownership forms – apart from a very general request for “more business oriented

organizations”. Since 1991 however, we have witnessed a remarkable transformation of ownership interpretations and ownership practices, in which it seems to me that the accounting reform played a very fundamental role as a “Trojan horse” which gradually reshaped collective cognitive patterns within the companies as well as among board members and politicians. From the perspective of Hope’s expressed distrust in the potential for “rational economic behavior” within a publicly owned system, this qualitative transformation process appears to have been a bit of a surprise.

With the accounting reform, each and every company was forced to adjust their economic measurement systems so as to focus on their accumulated capital values and capital returns. Through this exercise, political board members gradually both came to realize that their companies actually represented substantial economic values – even as measured by historical cost. They also learned that rates of capital return to their electricity companies were fairly low – even as compared to their own individual bank saving rates. Gradually and not without resistance from cooperative strongholds, economic efficiency became de-coupled from electricity price benchmarking with neighbor electricity companies and switched to a comparison of capital returns.

Rather than allocating economic surpluses between consumers and internal funds, capital owners gradually became the more legitimate beneficiaries. The Municipal Law also became adjusted so as to permit municipalities and counties to receive dividends from their companies – disregarding their formal judicial organizational forms, and more and more municipalities and counties started demanding dividends from their electricity companies and to increase their claims from year to year.

Political board members no longer primarily represented consumers or electors. They first and foremost represented their public institution in terms of capital ownership to the firm. The next step would be to restructure the company so as to obtain better control with capital returns from its different types of activities. Finally, the reshaped owners would engage in calculating how rates of return could be improved and how the accumulated capital invested in electricity alternatively could be invested in other types of activities. A stunning transformation of ownership – without any privatization or other shifts in property rights – forced in part through a “technical accounting reform”.

13.1.6 Shaping the market infrastructure system; point tariffs and third party access in national, regional and local electricity networks

Einar Hope and his SAF colleagues had devoted relatively little attention to the transmission and distribution part of the system. Their main concern had been with the electricity market, and the entire idea about applying the natural monopoly theory to the network infrastructure system came up rather late in the process, and came to be focussed primarily from the perspective of economic regulation and control. Other important innovative concepts however, came from others who engaged in finding appropriate ways of reorganizing the network system on the basis of Hope's re-framing of the entire electricity system. The two perhaps most important contributions were the point-tariff and the trade concession systems.

The idea about a point-tariff system rather than the traditional distance-tariff system, originated by two economists in Statkraft – Braaten, who was the chairman of the "Transmission Council"¹⁵⁹ in Samkjøringen, which was responsible for the high voltage national grid system, and Lauen, economy director in Statkraft. By the summer 1990, a working group organized by the council and headed by Braaten, presented a report which suggested changes in the tariff-system in the national grid system¹⁶⁰ based on an input/output principle. There was one price for feeding electricity into the grid, and another for taking electricity from it. Subsequently, physical distance between buyers and sellers did not matter as long as both parties had direct access to the high voltage grid system. The idea met opposition from power intensive industries who had benefited from their close location to large power stations in the previous regime, but it received support from the market reform collective as well as through out the general supply sector.

A point tariff system eventually got established not only in the high voltage national grid system, but also in regional and local electricity networks. Electricity could then be traded at a single price in the entire national electricity system (if no capacity constraints) where as one had to pay a price for transmission and distribution which depended on the physical point of access in either the national grid, a regional network or some local network. Separation of national, regional and local networks followed a pragmatic mix of mainly voltage and ownership criteria.

¹⁵⁹ Overføringsrådet

¹⁶⁰ Sentralnett

The establishing of the new tariff system became an important task for the NVE during 1991 and 1992. I have listed the following NVE reports from 1992, which contained general instructions to network owners and which provide an overall impression of the content of this work.

January 3 rd , 1992:	Designing transmission tariffs ¹⁶¹
January 14 th , 1992:	Annual reports and transmission tariffs ¹⁶²
February 2 nd , 1992:	Transmission tariffs. The point tariff system ¹⁶³
May 6 th , 1992:	Norms regarding canceling of contracts ¹⁶⁴
May 27 th , 1992:	Transmission tariffs statistics. Submitting tariffs to NVE ¹⁶⁵
July 19 th , 1992:	Point tariffs in regional electricity companies ¹⁶⁶
September 10 th , 1992:	Amplifications ¹⁶⁷
October 15 th , 1992:	Installation/shifting of measuring equipment (recommended solution) ¹⁶⁸
November 11 th , 1992:	Tariffs and economic reports

An important aspect of the work of NVE at this point, was to prevent companies from establishing “too profitable” tariffs. With the re-framing of the electricity sector by economic theory, electricity companies which had been perceived of as governed either by consumer interests or broad social interests, were now - in general - conceived of as profit maximizers which could be expected to behave completely opportunistically. A general trust in the appropriateness of the tariffs could no longer be based on the political legitimacy of local government ownership - even though the individuals at the boards were the same. Trust now had to rest upon detailed instructions and direct control from the (only) organization which in accordance with the

¹⁶¹ Utarbeidelse av overføringstariffer, NVE rapport

¹⁶² Årsoppgjør og overføringstariffer, NVE rapport

¹⁶³ Overføringstariffer. Punkttariffsystemet, NVE rapport

¹⁶⁴ Oppsigelsestid i norm for kontrakter, NVE rapport

¹⁶⁵ Statistikk over overføringstariffer. Innmelding av tariffer til NVE, NVE rapport

¹⁶⁶ Regionale verks punkttariffer, NVE rapport

¹⁶⁷ Presisteringer, NVE rapport

¹⁶⁸ Installasjon/utskifting av måleutstyr (anbefalt løsning), NVE rapport

new economic conceptual framework hold social responsibility; the state regulator.

Due to both the increase in control ambitions and the imposed downsizing of NVE staffing, the control issue tended to create substantial administrative overload. Much of the regulatory interventions in the end followed as the NVE came to serve as an appeal court for conflicts between network owners and network users over tariffs. In many of these conflicts, which appeared in newspapers and journals at the time, network owners were accused of “blowing up” the value of their network in their newly established balance sheets in order to calculate higher tariffs. In a few cases such allegations were justified by the NVE and tariffs reduced.

The other invention originated within the OED in 1989/90. It contained the idea about a new concession (license) system called “trade concession”. The new concession permitted the state regulator to specify conditions specifically to different types of activities and to the different categories of organizational structures represented within the sector. The system covered both judicial entities owning electricity networks and companies buying and selling electricity in the market (physical trade). Concession was not needed to buy or sell financial electricity contracts. The very flexible concession system permitted the NVE to develop contractual conditions over time so as to force specific types of actors to adopt to additional requirements.

A major concern in the new system was to safeguard the operational separation of monopoly activities from competitive activities and thereby non-discriminate third party access also to regional and local networks. The network company license holder was obliged to transfer electricity to all consumers within his area – disregarding who were their electricity suppliers. He was also obliged to hold track of the various suppliers in his network and to calculate and administrate payments between different suppliers. Such a “measurement, calculation and payment” system represented a necessary economic infrastructure system for the market to function, because ex ante contracted volumes always deviate from real consumption, which can only be measured ex post. To hold track of these differences with a large number of suppliers and mainly manual reading of each consumer’s consumption, clearly represented substantial transaction costs which derived from the market system, but which were allocated to the natural monopoly system. Network owners accordingly introduced substantial transaction fees on the shifting of supplier in order to recover the costs involved (and possibly, to reduce the number of shifts). This made such shifting practically prohibitive for small consumers.

The trade concession system became an important and very powerful governance tool in the further development of a "natural monopoly" regulation and control system. License periods were set on a yearly basis to start with, in order for the regulator to upgrade license-conditions quickly if needed, and network owners could potentially be "punished" through redistribution of licenses or upgrading of license-conditions if they did not "behave". The NVE under Jan Moen's surveillance initiated new research projects where economists – in particular from SNF - worked on finding improvements to the regulatory system by applying models and methods offered by economic regulation and control theory.

With the accounting reform, the point tariff system and the trade concession system, the natural monopoly concept became stabilized as a generally accepted reality through out the sector as well as within its affiliated research institutions. Despite the fact that these changes represented a fairly radical redistribution of governance rights between the state regulator and the local political network owners, few protested at this point. The market reform collective had expanded to hold a very powerful capacity to transform elements of its environment.

Through these reforms, Norway by 1993 had established the perhaps most open third party access competitive market system in any electricity system world wide.

13.2 Regulating market behaviors and organizational changes

Economic regulation of profit seeking agents had moved to the focus as an exclusive task for the state in the new market system. Local governments had in effect been excluded - with a reference to economic theory. Through delegation from the SAF/OED market reform collective, the NVE market department came to represent the state regulator. Another state regulatory institution which entered the stage, was the State Competition Authority (KT¹⁶⁹) – in particular after the new competition law had been approved in 1993 and Einar Hope took over as its managing director in 1995.

The economic re-framing of the sector had created two distinct regulatory roles; the market regulator and the "natural monopoly" regulator. Hope argued that regulatory responsibilities between these two parts should be separated in a distinct way so that KT hold responsibility for market regulations and NVE for the natural monopoly regulations. This turned out

¹⁶⁹ Konkurransetilsynet

not to be that easy – in particular because the comprehensive concession law system which related to a multiplicity of issues within the electricity sector, belonged to the jurisdiction of the NVE. The concession laws are based on the principle that nothing is legal unless it is specifically permitted by someone uniquely defined. For instance, companies were required to submit an application for renewal of their concessions in case of any formal changes in property rights or organizational form. In case of, say, an acquisition of one company by another, this permitted the NVE to set up additional requirements as conditions for granting a renewal of concessions involved. Hence, the concession law system in general provided the regulator with much stronger governance instruments than did the competition law, which is fundamentally based on the opposite principle: Everything is permitted which is not explicitly forbidden. The consequence was that the two institutions to a large extent had to cooperate on regulatory interventions in the market.

13.2.1 Regulating the market, enforcing competition and shaping company forms

State regulations in the Norwegian electricity market have been guided rather closely by economic theory and the principles and ideas laid down by Einar Hope and his SAF colleagues in the 1989 market reform report. The ambition has been to see to it that competition was enforced through initiatives to stimulate competition - like reducing barriers to entry into electricity trade and reducing transaction costs for consumers shifting between suppliers. It has also been to prevent cooperation among generators and vertical integration between competitive and monopoly activities. Through the state regulatory institutions, the market reform collective were at least in part able to direct and control the further restructuring of the industry at regional and local levels.

One of the first issues which emerged, concerned whether or not the regulator (NVE) should accept an acquisition of a vertically integrated company by another vertically integrated company. The case was the regional company Akershus Energiverk which wanted to purchase the local supply and distribution company Oppegård Energiverk. Akershus thereby had to apply to the NVE to take over the area concession hold by the distribution company. In the end, NVE ruled that in order to prevent further vertical integration, the company could not be sold unless its competitive and monopoly divisions were sold separately to different judicial entities. In order for Akershus to purchase the entire company, it had to reorganize its own network division into a separated judicial entity – for instance as a subsidiary. This regulatory intervention turned out to have significant

effects, as companies with ambitions to merge with or acquire other companies started restructuring themselves into new corporate forms.

Another issue appearing at the regulator's desk, related to the establishing of three large regional cooperative arrangements in 1993 – in the wake of the generator campaign to increase spot market prices and mobilize for a political intervention to constrain the new market. The three largest cities Oslo, Bergen and Trondheim formed a cooperative called OBT Kraft, four county/regional electricity companies along the south coast from Telemark to Rogaland formed the cooperative entity Sørkraft, and ten different electricity companies in the middle and northern part of the country formed Nordenfjeldske Energi. A fourth cooperative – Fylkeskraft Østlandet – had already been established in 1987 to coordinate negotiations with electricity sellers at the west coast before the market reform. Together with Statkraft, these organizations by 1992 accounted for 73% of total electricity production.¹⁷⁰ This time no concessions were involved as the new organizations remained cooperative arrangements where each participating company maintained its autonomous status. But the new competition law ruled against market cooperation which had a potential to influence market prices. After obtaining a report from Lars Sørgaard at NHH/SNF which discussed the problem from the perspective of economic cartel theory (game theoretical industrial organization theory), the KT in December 1994 ruled that the two cooperative organizations Sørkraft and OBT-kraft were illegal market arrangements and had to be dissolved¹⁷¹. The KT argued that on the one hand, they had the potential to influence prices, and on the other, their lack of ownership integration made them unlikely to exploit any substantial efficiency gains from their cooperation. The decision also provided guidelines for the two other organizations. Where as OBT-Kraft decided to reduce its activities to a joint office for commercial contracting, Sørkraft appealed the KT decision. In the wake of the Swedish deregulation and the merging of the two national markets in 1996, Sørkraft was granted permission to continue based on the argument that the cooperative represented no substantial market share in the enlarged market.

Also this case set important benchmarks for the future restructuring of the sector. Integration through traditional cooperative arrangements had proven difficult as it directly confronted a fundamental anti-cooperative concept in

¹⁷⁰ Lars Sørgaard, Report to the competition authority, 1993

¹⁷¹ Sørkraft appealed the decision and received permission after Sweden had joined the market in 1996

the economic theory of the new market system. This turned the attention of companies towards formal capital based integration like mergers and acquisitions rather than the federative arrangements traditionally used by cooperatives.

A third type of regulatory intervention related to regional electricity generators which executed the powers of established contractual agreements and exploited the fact that the many small consumers were still locked into their local distribution companies due to prohibitive switching costs. The strategic ambition was to lock local distribution companies into long term electricity contracts at prices above competitive market prices, and to discriminate consumer prices so as to maintain large consumers at the cost of the many small locked in ones. To break off these interlocking directorates inherited from the previous regime, became an important element in the efforts of KT and NVE to break apart traditional systems of inter-organizational domination and thereby increase competition and shape autonomous market actors - as prescribed by theory. One of the most important cases in this respect, was the NVE ruling on the area concession to Sunnhordland Kraftlag (SKL), which is a regional electricity company in northern Rogaland and southern Hordaland counties. SKL is owned by local distribution companies, which again are owned by the municipalities within the region – a typical historical cooperative structure. In this case, the NVE refused to provide the SKL with an area license until it changed its arrangements with its local distribution companies, who at the time in late 1993, still received all their electricity from SKL. Another interesting outcome of this case, was that the local distribution company Kvinnherrad Energi, decided to sell its share in SKL at a market price and transfer the capital acquired to a municipal fund for entirely different purposes. Such an act would have been unthinkable before 1991, and was gradually followed by a few other municipalities¹⁷².

During the period with high market prices in 1996/97, many cooperative electricity companies decided to keep prices to consumers within their traditional supply areas below market prices, where as consumers from other areas had to buy at the higher price. Also these cases ended at the regulator's desk, and the new competition-director Einar Hope argued that this practice undermined the principle of a single market price and should be abandoned. This time however, the Ministry of Municipal Affairs intervened and claimed that the constitutional autonomy of the municipalities prohibited the

¹⁷² In Sweden, this had been common practice for many years.

state from intervening directly into their pricing policy. Einar Hope and the KT had to back down.

To further increase competitive pressures, the NVE collected and published information on contract prices. This work was later taken over by the KT. The state also decided to regulate the price consumers had to pay when shifting from one electricity supplier to another. Step by step the transaction fee was reduced from approximately NOK 5000,- to NOK 200,- before it was abolished all together. Small consumers can now shift between suppliers at short notice without cost. Network companies were permitted to recover the actual transaction costs in their network tariffs, so that the costs were allocated to all the consumers.

Finally, the NVE introduced a system in which small consumers could trade on standardized consumption profiles over the year. This eliminated the need for continuous measurement of individual consumption, as yearly consumption became distributed over the year in accordance with a simple average model estimated for the entire population of small consumers. By 1996, accordingly, even the smallest consumers could easily shop electricity from whatever electricity supplier they wanted, and new broker companies entered the stage who specialized in mediating the cheapest available electricity in the market to households and other small consumers.

By these regulatory interventions, the probably most competitive electricity market world wide emerged also for small consumers, and the organizational restructuring process within the sector was forced into specific forms which also in essence derived from economics.

13.2.2 Regulating organizational changes over time

Several of the regulatory initiatives and interventions into the new electricity market contained ambitions to influence the re-structuring of regional and local electricity companies. The preferred organizational structure was the one which had been forced through for the state company; a complete judicial separation of market activities from transmission and distribution monopoly activities. But, such a separation was in general opposed to by company managers, who wanted to maintain managerial controls with both types of activities rather than handing this “top level of coordination” over to the owners (the politicians). The conflict was accordingly quite similar to the one between the market reform collective and Statkraft during 1990-1991.

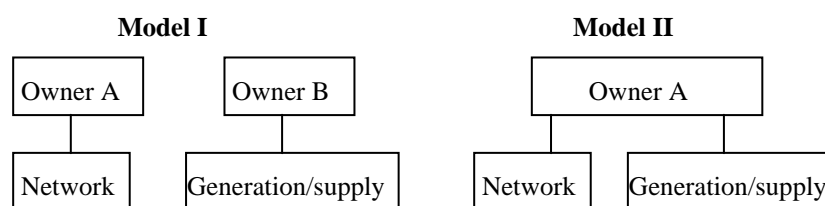
A variety of different initiatives taken by electricity companies to restructure their organizations had implications for area concessions and accordingly showed up as applications for various concessions. This induced the OED/NVE to develop a more systematic policy which could provide general

guidelines when conditions for new licenses/concessions were granted. Because of the limited legitimacy of the state to interfere into municipal property rights, the new policy came to represent both a compromise and an outline of a long term strategy to “upgrade” organizational structures over time so as to approach the preferred model. To create additional transformative capability, a range of new demands were included into new trade licenses in which special conditions regarding the organization of the license-holder were included. The explicitly stated purpose was to prevent further vertical integration and to secure that network activities were managed “completely independently from other activities”¹⁷³.

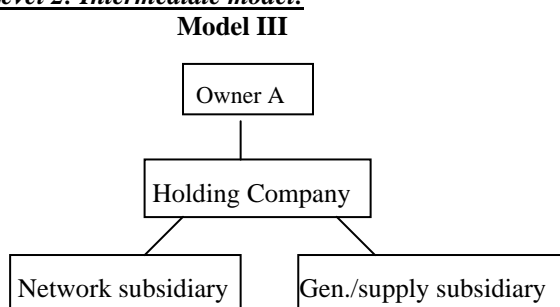
To guide licensing conditions, a hierarchical system of organizational models was developed in which individual companies were permitted to escalate but not to descend. The system was the following:

Figure 13.1. The hierarchy of organizational models

Level 1: Preferred models:



Level 2: Intermediate model:



Level 3: Least acceptable models:

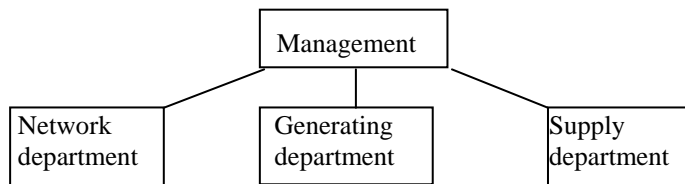


¹⁷³ Standard formulation in new area concessions provided by NVE from 1997.



Level 4: Not accepted model:

Model 0 (traditional vertically integrated organization)



Source: Enclosure to area concession license, NVE, 1997

In case of mergers and acquisitions, the new license-conditions ensured that the new company at least became organized such as the most “advanced” of those companies being merged. The hierarchy of models directed the preferred route of further developments. The system implicitly also allocated different degrees of economic legitimacy to the different models. By 1996, only one public electricity company was organized in accordance with level 1 models; the one in the city of Drammen (model II).

The “up-grading of organizational structure” regulatory system is an interesting example of how new systems of power are created to direct specific types of local behaviors. It starts with a simple statement derived from economic theory, which is largely ignored or rejected by local actors. Then, the state-economist collective starts experimenting with different “loads of legislative authority” in single cases, before a more complete system of institutional loads to support the initial simple normative statement is established. In the end, there is a durable system of power which either induces local actors to change their organizations to obtain the more legitimate form, or forces them step by step to escalate up the ladder of ranked forms.

The case also illustrates how governance is expanded through the market reform, through regulatory innovations which dig into the autonomy of civil society economic agencies in a multiplicity of ways in order to force a specific reshaping and re-formatting of their structures and their economic actors.

13.3 Regulating the natural monopoly; shaping the monopoly regulation and control system

A natural monopoly is defined in economic theory as a situation in which the cost function of a production is such that the average unit cost decreases with increased output within the entire relevant demand interval for the good produced. The downward sloping average cost curve has the consequence that competition between producers will not provide the optimal social output. Rather production should be managed by only one producer¹⁷⁴. The concept of a natural monopoly is a very simple and powerful one, and it certainly caught on quickly within the electricity sector as the new framework for understanding what the electricity network “really was”. It provided for a clear cut concept of separation between the two parts of the electricity system and a simplistic conceptual identity to the part of the electricity network system which by far represented the most employees.

The argument that the electricity network constituted a natural monopoly was not primarily based on the view that each part of the system had a downward sloping average cost curve more than many productions typically found in market organized systems. Rather, it was the entire national network which was taken to represent the monopoly in the sense that it would not pay to construct a parallel system disconnected from the other. It was accordingly primarily the connectedness of the technological system which turned it into a natural monopoly. But, then one could of course ask if this is not also the case for generating plants and consumption units. It would obviously not pay to disconnect these from the integrated system either. It seems to me that one could argue that the entire technically integrated Edison central station system is what constitutes a “natural monopoly system” in this sense - with all its different parts and functions.

It appears to me that the actual concept of separation is rather a functional than an economic one. Some important functions within the integrated central station system such as generating and trading were re-framed as competitive activities suitable for market organization. This separation at the same time re-constituted the remaining part of the electricity system as a *necessary market infrastructure* system with a great number of functions and types of activities. One important consequence of this re-framing was that

¹⁷⁴ There are other insights from the natural monopoly model as well, such as the problem of cost recovery at the social optimal level of output.

the new market actors became economically dependent on an infrastructure system which they no longer controlled. This is – I think – basically what established the need for state monopoly control from the point of view of economic theory. One has to prevent those in control of the market infrastructure monopoly to exploit those dependent on it; like generators, traders and consumers. The cost structure of the market infrastructure appears to be essentially irrelevant to the need for monopoly control in the case of a physically integrated system.

Re-framing the non-market part of the system in this way, permits us both to see the apparent problem the natural monopoly concept run into, and to reveal an interesting process of gradual re-framing of the “natural monopoly” in which more functions were found to be suitable for competition in markets or quasi-markets. As a consequence, the natural monopoly understood as an integrated hierarchy step by step “shrunk”, and the number of functionally defined competitive systems increased.

13.3.1 The initial monopoly control system

Through out 1991 and 1992, the NVE also engaged in creating an initial economic monopoly regulation and control system; a so-called “rate of return” regulation as suggested by the SAF. The system was restricted to a regulation of capital returns from each network company fixed at a maximum rate set at 1% above the risk free market interest rate as measured by long term Norwegian state bonds. In order to calculate rates of return to network investments, the system was fundamentally dependent on the accounting reform. The NVE also initiated an additional fairly comprehensive information gathering system where network owners had to report in detail about their electricity networks as well as their about organizations.

With the completing of the accounting reform by December 31st 1992 and with the new tariff system in place, the new regulatory system became operational from 1993. In 1994, the NVE started controlling and calculating economic rates of return to each network owner as calculated on the basis of the historical cost principle. Those with larger returns than permitted were forced to repay consumers through lower tariffs the following year. With this system, the NVE and the SAF on the basis of economic theory, had constructed an integrated economic governance system in which economic results in network companies were just as much outcomes of these constructions as outcomes of the economic activities themselves. Their calculated capital values were administratively set by the NVE – not by market valuations. Depreciation rates were set by the NVE. Accounting rules were set by the NVE. Maximum rates of capital return were set by the NVE.

Deviations were corrected and surpluses reallocated by the NVE. Economic autonomy of local network owners had thereby been substantially reduced by an entirely new durable system of domination created by the market reform collective.

The problem with the rate of return regulatory system from the point of view of economic theory, was that the regulatory system provided network owners with no incentives to reduce costs. All costs were deducted before the rate of capital return was calculated. There was also some room to maneuver within the accounting system which permitted network owners to adjust their numbers so as to avoid breaking the rate of return limit.

Even though tariffs in between 1993 and 1996 declined on average, this could be explained with the general reduction in market interest rates. The system was clearly unsatisfactory from the point of view of the market reform collective, and new initiatives were taken in 1995 to improve the regulatory system. Equipped with large quantities of data about each network company, NVE director Jan Moen headed a project group together with SNF researchers to create a much more powerful system to be introduced from January 1st 1998.

13.3.2 An attempt at structural reform of the network system

In 1993, there was yet another electricity network reform initiative which originated in the natural monopoly theory; a restructuring of ownership to electricity networks. The idea had strong links back to the hierarchical program, but the basis for the new initiative appears to have been the new natural monopoly concept. A traditional formulation says that “there should only be one producer”. In the standard interpretation, this would mean that there should only be one company with one set of share owners to organize the entire production. But, this is to say more than what is provided by the cost structure argument as such. What seems to follow from the argument, is that production should be efficiently coordinated. How to achieve efficient coordination in some real world case, appears to be an all together different issue.

Many of those elements which had to be coordinated were already coordinated in a tight state governance system under the concession law system, the new energy law and a system of agreements between network owners. Both a “line-concession” system for high voltage power-lines and the area concession system provided the NVE with substantial abilities to coordinate and direct the different network owners and their many activities. In addition, the state hold direct ownership to Statnett S.F. The economic regulation and control system added another important governance system to

the overall hierarchical state governance system towards the electricity network system.

Never-the-less, a project which aimed at restructuring property rights within the electricity network system was initiated by the NVE in 1993. Responsibility for the project became delegated to Statnett S.F. under the leadership of former NVE employee and member of the governance committee of the 1989 SAF market reform project; Svein Storstein Pedersen. Statnett engaged Einar Hope and the SNF to work out a report on the theoretical basis for such a restructuring of the network system, and to come up with alternative solutions. (Formally, the NVE served as the principal towards SNF).

The report “*The extension of the national grid. An in principal analysis*”¹⁷⁵ was presented in August 1994 and argued that in principle the entire electricity network should be owned and operated by only one company. For pragmatic reasons however, the report concluded that only the medium voltage (132 and 66 kV) networks should be merged with the national high voltage system, where as the 22 kV local networks should remain with their existing local distribution companies.

The report received substantial opposition from regional electricity companies and their organization EnFO. To directly confront regional and local property rights turned out still to be an impossible task. The report was in effect rejected as a basis for network reform, and Storstein Pedersen and Statnett were forced into complex negotiations with regional electricity companies over different organizational models which included both ownership and technical and market related organizational principles. As the systems varied substantially from region to region, it turned out to be impossible to find a basis for agreement on any substantial restructuring of ownership. In the end, only minor changes were made – mostly in order to “balance” access to the national grid system between regions. In most cases, this had the effect of transferring power-lines owned by Statnett S.F. to regional companies and not the other way.

With this defeat, the idea about an integration of the network system through a unified national ownership had reached a dead end. The electricity network system remained an “irrational organizational system”. The market reform collective had to accept that one had to live with a large number of regional

¹⁷⁵ Bjørndal, Mette, Einar Hope and Hans Olav Husum: “Sentralnettets utstrekning. En prinisppiell analyse”. SNF-rapport 62/94. My translation

network companies, and that the “natural monopoly” had to be coordinated through regulations rather than through integrated ownership. The case also demonstrates how a project may break down when its opponents are capable of rejecting core simplified elements and force these into unmanageable complexity. The powers of its powerful initiators literally disappears.

13.3.3 Yardstick competition and DEA analysis as a basis for economic regulation

The new concept of monopoly regulation developed in between 1995 and 1997, took the fragmented ownership structure as its starting point. Its master concept was “yardstick competition”, taken from game theoretic economic regulation and control theory. Through administrative comparisons between relatively similar network companies or between companies and a representative model, information about the relative efficiency of companies could be obtained by the NVE. An incentive scheme could then be constructed in order to induce network owners to increase their efforts to become more efficient.. This is the simple principle. A practical real world system which does not produce severe counter-effects was a much more cumbersome challenge.

The first problem was to define in practical terms what was to be measured. Major issues here, are to isolate historical effects from current administrative effects and demographic and topographical effects from organizational effects. One had to sort all the network companies into relatively homogenous groups in order to compare them. This is not easy, as typographical, meteorological, demographic and organizational structures vary tremendously from region to region. In order to sort out these difficulties, the NVE once again engaged professional expertise from the SNF. The economist Sverre Kittelsen became the core professional participant in the establishing of a comparative system based on the highly technical DEA analysis. Now, the comprehensive amount of data collected from each network company could be fed into a computer program which calculated the relative efficiency of all the network entities and sorted them into three groups with different efficiency levels.

The next problem to be solved was the lack of appropriate economic incentives in the rate of return regulatory system. The alternative economic model – practiced for instance in the British network system – was a price cap system. Here, the regulator fixed the maximum price to be charged by taking the initial price and adjust it for inflation and then specify efficiency improvement requirements in order to arrive at a new regulated price. This will ensure both efficiency incentives and a division of the gains achieved between the firm and the consumers. The problem is that owners thereby

have an incentive to reduce investments, maintenance and service in order to increase profits.

The solution to this problem was to establish a much more comprehensive regulatory system based on a principle of income regulation. In effect, the new system regulated both rates of return, prices, investments, quality and efficiency improvements in a much more detailed and complete way. For each and every year, the regulator decides a maximum income for each company based on presented budgets, expected inflation rates, delivery volumes, spot market prices, efficiency improvement requirements etc. for the year to come. Based on actually accounted results, investments, inflation rates, delivery volumes, spot market prices, energy losses, interest rates and so forth, the regulator adjusts the maximum income permitted for each company. Too high incomes will then be adjusted for in the next year along with too low incomes. A whole range of elements relevant to the company's operations could then be included into a single formula to be used in the 5 year period between 1997 and 2001¹⁷⁶.

In reality, this very tight economic governance system turned the entire electricity network system into something very close to an integrated hierarchy. Each company could be forced to take on efficiency improvements over time without having any routes to escape if it was to maintain a necessary economic return over time. Each network company had lost a substantial share of autonomous governance rights which usually derive from property rights. Property rights and economic governance and control had become nearly completely separated, and economic governance rights in large had become redistributed to the NVE. All of this resulted from a process of innovation framed by the natural monopoly concept in which ever more sophisticated elements extracted from economic theory were added to a growing system of domination and control. The case is a wonderful illustration of the role of economics in industrial transformation processes and the role and character of power as an aggregated durable system of loads which are constructed and collected by some entrepreneurial collective in order to direct behaviors in accordance with the program of the collective itself.

At the same time, one can also conclude that owners as well as managers had received a system of governance with substantial powers to rationalize their network companies. Many of those found the new system very useful in this

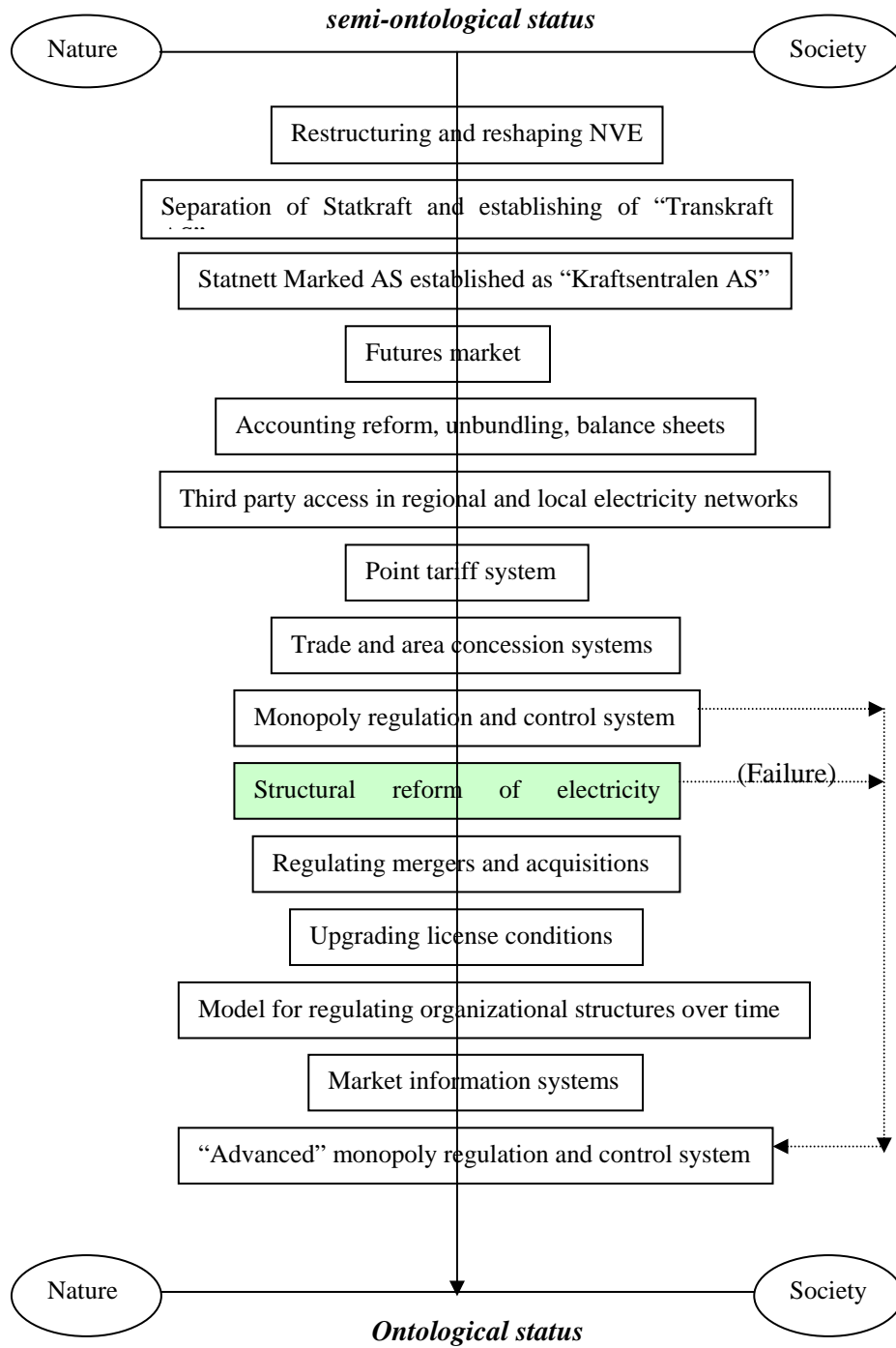
¹⁷⁶ For a detailed presentation of the system, see "Retningslinjer for inntektsrammen for overføringstariffer, NVE Oktober 1997.

respect, and engaged with substantial enthusiasm to fulfill the intention of the new regulatory system – and some even beyond that.

13.4 The role of economics in shaping market- and state governance systems

Through the survival of two instances of severe economic problems and through a large number of interrelated change projects, we witness the process which eventually stabilized the new electricity market system as a durable, robust, locked-in economic system. From the representation presented by the SAF in 1989 which provided a new framing of the electricity system, and from the legislative breakthrough in 1990, a market system with specific industrial structures, trade systems, infrastructure regulations, electricity companies and economic actors emerged, largely due to the tremendous amount of work carried out by state regulators and professional economists to create these outcomes. Through the process, essential industrial and organizational structures were re-configured, major power structures shifted and essential collective cognitive patterns re-formatted. To our model of the ontological stabilization process, we may now add a substantial number of additional elements:

Figure 13.2 Stabilizing the electricity market system by adding elements



All of these elements had been specifically shaped by economic theory. Non of them were for instance structured according to electrical engineering theory; the system design scientific tradition represented by Vidkunn Hveding and his colleagues at Norway's Technical and Natural Science University (NTNU). The entire system had become reshaped on the basis of core concepts from within economics.

Not all the projects were successes from the point of view of the market reform collective. One was an apparent failure, where as others involved compromises with other collectives of actors. But, over all, the outcome was a system with both structures and behaviors that were shaped by and thereby became embedded in economics as a modern scientific discipline, which were added to the aggregated historical power systems within or related to the sector.

The process of transformation contained partly parallel, partly sequential projects. Some projects depended on the previous fulfillment of several other projects. For instance, the one of creating an effective economic regulation and control system for the natural monopoly system, depended specifically upon the successful implementation of the accounting reform, the tariff reform, the information gathering project and the area concession reform. The process accordingly needed substantial strategic coordination and distinct project managerial capabilities in addition to the institutional powers offered by state legislative and governance authority.

The power of modern economics to break into and transform economic sectors categorized by strong lock-ins, seems to result from the aggregated capabilities of its comprehensive pool of simplified theoretical principles, models and concepts which address a very broad set of problems within economic systems. Through the translation and mediation of these by trained economists, they become specifically adjusted to real life systems, improved upon and forced through by a combination of scientific legitimacy and arguments and state institutional powers. Adding to this, a large number of educated economists bring these theories, models and concepts to a large number of local activities where they – supported by the centralized reform – engage in re-shaping local activities in similar ways. Together, they constitute the aggregated powers necessary to break into, overturn and reshape structures which have already been shaped by other powerful historical collectives.

Despite the major breakthrough for the electricity market reform collective with the new energy law in 1990, the outcome of individual re-shaping projects seem never to be guaranteed, being still dependent on actions taken at the frontline between the expanding economics collective and collectives

that are historically locked into the industry by their own durable systems of power. The limited restructuring of Statkraft and the state take-over of Samkjøringen represent at least partial failures of the market reform collective to establish its preferred solutions. However, as the structural reform of the electricity network case demonstrates, the failure of one project may be countered by another project derived from an alternative approach to solve the same problem. The lack of integrated ownership in the “natural monopoly system” due to institutional lock-ins, was “solved” by separating property rights from de facto economic governance rights and by turning governance rights over to the state regulator. Detailed and sophisticated governance systems were then applied to the state regulator which provided at least as tight economic controls with local companies as what we find within many corporate economic systems. The game seems to be one of finding a passage point into the overturning of the rival collective which is not defended by strong institutional lock-ins.

The exclusive role of the state regulator in economic theory, provided the market reform collective with a particularly useful point of entrance from where powerful governance systems could be constructed and applied in such a way as to make local economic behaviors highly predictable and governable. It may even be illuminating for the sake of understanding, to exchange the notion “state” with the notion “core of economics collective” in the role as the actual market system regulator; the actor responsible for overall social efficiency.

13.4.1 The shaping of “rational economic agencies” and of “economic man”

Through the market reform process, we also witness the shaping of “rational economic agencies” and of real life economic man who behaves in ways very similar to the concept of economic agents in economics. In economic theory the concepts are not taken to be descriptions of real economic actors. On the contrary, they are thought of as extreme simplifications applied as assumptions in order to formalize economic problems in mathematical models. The striking observation, is not that these concepts of economic man are unrealistic, but rather that they tend to become reality through lots of work by economists to advance these concepts for the sake of improving economic efficiency in society.

A particularly interesting case is the shaping of the power pool/market institution and the gradual transformation of related bilateral trade to organized non-relational trade. Economic theory here serves in the role as a “relation-destructing device” in between economic agencies by shaping institutions, contract systems, technologies, measurement systems, role

distributions etc. etc. in which actors can and are invited to calculate the “pure” economic value of commodities, financial contracts, risk exposures, etc. and trade these without reference to any other objective than to maximize their economic utility from the transaction.

This way of doing trade is not a “simple and natural” way of basic human interaction. It is a highly specialized activity which cannot take place in any large scale without the constructive formative role of economics and economic technology systems. At this point, my observations clearly confirms the argument of Michel Callon that economics plays a dominant role in the creation of human calculative capabilities and of real life economic man. Through the re-shaping process, we witness the creation of economic man as a deliberate outcome of the efforts of the market reform collective to transform “irrational” economic organizations and actors. By accepting, understanding and “doing” the role they are given in the new system, irrational actors become rational.

The role of accounting systems – or measurement systems in broader terms – in formatting agents is interesting in this respect. It seems to me that the accounting reform played a very fundamental role in the reform process by defining property rights in terms of capital ownership rather than community membership, in a highly operational way. In effect, this operational/technical change contained an essential change in the content of and the implicit distribution of property rights. It kind of “dissolved” a public cooperative sector and turned it into an “as-if-private” economic sector where actors were asked to and expected to behave as private capital owners despite the fact that they were still representatives of their community electors.

Furthermore, the new accounting system provided a very powerful state governance tool as well as the foundation for a number of additional centralized regulation and control systems which aimed at governing and controlling some specific aspect of sector activities – like the 1996 electricity sector tax reform which turned public sector electricity companies into ordinary commercial tax objects, and the 1998 monopoly regulation and control regime.

Interesting to note also, is that notions such as “liberalism” and “economic freedom” is not what really comes to ones mind when observing the transformation process. On the contrary, the new system was shaped by the *adding* of a lot more state governance systems with a capacity to govern and control organizations and behaviors through out the electricity sector which goes well beyond the capacity of the previous system. This is not only true for the natural monopoly part of the system, but also the competitive. At the same time, most of the existing state governance system was kept – notably

the comprehensive and powerful concession law system which became adjusted as well as empowered through the process.

The natural monopoly system however, in particular illustrates the new capacity of modern economics to generate economic governance and control system which may provide a state regulator with a hierarchical governance capacity far more impressive than probably even thought of by Oskar Lange or the EdF engineers. This results from the economic legitimacy provided by the natural monopoly argument of course, but more so by the application of optimal control theory which is an “imitated market” price-theory based on the SRMC principle, by the application of regulation and control theory based on game theory with asymmetric information, by the application of specifically designed accounting systems and principles and economic report systems based on these, by the application of DEA analysis, etc. etc. Through these many governance concepts and instruments the electricity company and its actors in effect gets wrapped in from “all” directions and can do little but to comply.

Through the successful fulfillment of these many projects, the new market system gradually moved towards a stable ontology locked into the electricity sector by the many new systems of power generated through the process. When most of the identified problems had become resolved and implemented as operational elements of the industrial system, we may talk of a mature, stable and well-functioning market system where actors behave mainly in accordance with the roles they have been given – as simplified elements of the market reform collective. The more substantial the powers produced and the more complete the transformation, the more predictable, manageable and “rational” will be their behaviors from the point of view of the market reformers.

Summary and Conclusions

14 Summary and conclusions

A summary of my analysis exposes the many different perspectives and levels of investigation in a project which has aimed at both exploring theory and methodological concepts and approaches, and at explaining about a large scale economic reform. On the one hand side, there has been an exploration into economic and social theories, methodologies and analytical constructs which has aimed at finding adequate routes and tools to address the research questions and challenges raised. On the other side, there has been an empirical investigation which covers a sequence of historical events which ranges from very extended to rather narrow perspectives and which yields both some explanatory results and possibly a few normative implications. An adequate summary accordingly necessitates both a separate outline and a synthesis of these diverse contributions.

The combination of a search for an adequate theoretical framing, for useful analytical concepts and for empirical knowledge, is a result of the perceived interdependency between theory, methodology and empirical evidence. The result is a mosaic of concrete evidence mingled with perspectives, concepts and arguments that are abstract and general. If this mix is convincing, it is probably not because each element of evidence or each line of argument is not refutable, but because the combination makes sense and provides a contribution to our understanding of the market-making phenomenon discussed. I do of course hope that my arguments seem reasonable, but I would be even more thrilled if I have managed to provoke further explorations into the phenomenon discussed by those who find the approach and the contributions still unsatisfactory. Then, the efforts have been worth the price.

The analysis leans itself on the overall framing of a theory and methodology about entrepreneurial collectives presented in part 1, mostly drawing on contributions from sociology of science and technology and from economic sociology, but also with reference to other areas of scientific thought. Together, the theoretical apparatus collected outlines elements of *a general methodology of change-making in society* which starts out without a comprehensive theory of society itself, of the economy, of particular industries, about stable characteristics of human actors, of institutions or of the relative rationality of different economic systems. These types of phenomena are rather generated along the way through historical processes - in rivalry with alternative categories of actors, institutions, economic systems etc. Instead, one starts out with the emergence of interpretative categories, particular purposes of the future and cognitive frames which comes to define entrepreneurial collectives as “circulating entities” stabilized by their own holding togetherness. These entities expand by enrolling

elements of their environment into their own networks through processes in which the collective aims at stabilizing itself, its program and its collective things in society. They expand through processes which have been addressed by notions such as re-framing, re-configuration, re-shaping, re-formatting, molding of content and construction and collection of durable systems of power. The act of expansion is accordingly seen as a simultaneous qualitative and quantitative transformation in which a non-member human or non-human is enrolled and becomes a member (or a collective thing) of the collective.

Because the actor-network methodology offers a different framing and a different set of basic categories for the type of story one can tell, it also invites a rethinking of some of the fundamentals in economic theories that are concerned with explaining economic and industrial change; theories which typically starts out with either stable categories of actors - like in new institutional economics - or with stable categories of collective institutions - like in economic sociology and traditional institutional economics. It is thereby able to bypass the apparently never ending controversy between these two alternatives. It also offers a particularly strong argument against structural and functional types of explanations like for instance mechanical cause arguments or Darwinian “natural selection” types of causal explanations about why certain economic systems and organizational forms exist or emerge. Rather, the approach regards them as essentially floating phenomena, prevailing as long as their blackboxes (simplifications) remain closed and as long as they are being held on to by those networks which somehow provided for their stabilization in society.

In between an outline of empirical findings and normative implications on the one hand, and a rethinking of some of the basics in theories about economic change on the other, the ambition has been to address some theoretical problems at a more intermediate or middle-range level of analysis. A major focus of attention has been to investigate into the specific role(s) of economics in the making of the economy. This suggests a theory about economic efficiency which corresponds to an explanatory emphasis on final cause explanations; on economic efficiency as a purpose of the future. Such a theory should be able to outline the mechanism of change in question and to explain why and how scientific economics plays such a powerful role.

Another focus has derived from the need to solve the apparent contradiction between the path dependency theory embraced by institutional economists and the radical de-locking observed. A general solution has been outlined in part 1 based on a critique of the limited explanatory contribution represented by the economic increasing returns argument in relation to “lock-in-making” and “de-locking”. Rather, I have suggested a path dependency theory which

carries more on a dynamic concept of power which makes it possible to explain with more substance both how lock-ins are created and how they may be de-locked.

Finally, I have focussed on analytical concepts which might be useful to address different types of activities and events on the trajectory towards stabilization of an economic entrepreneurial collective, its program and its collective things within some sector of the economy. The summary will both provide a short-hand review of these elements in the context of the Norwegian electricity market reform, and discuss the character of the economic change process in terms of concepts such as purpose, trust, choice, chance and necessity.

The summary is divided into three different parts. The first provides a summary of the major empirical findings which contribute to explaining why and how Norway became a hotbed for market reform of the technically integrated and institutionally complex and locked-in electricity system. Then, the stability of and some possible future challenges for the market reform will be discussed along with a few normative implications for other electricity market reforms as well as large scale economic reforms in more general terms.

The second part discusses various medium range theoretical findings, theory constructions and suggestions which derive from the molding of the overall theoretical perspective and analytical concepts presented in the theoretical and methodological introductory with the empirical evidence presented through parts II - IV.

Finally, the third section pulls back to a reflexive perspective, to the problems of some of the basics in theories about economic change, and to some of the possible problems and shortcomings of the presented theoretical and methodological approach at the present stage.

14.1 The Norwegian electricity market reform process. What can we learn from it?

First, we may conclude that the Norwegian electricity market reform in several respects is a special if not unique case. It emerged and became in part structured on the basis of specific natural, political and historical conditions. For instance, Norway is a nation with large resources of energy of different kinds, with absolutely no serious concern with its own future energy supply situation – a situation which probably provided a basic security of supply which provided a “relaxation” needed for voluntary and radical large scale

economic experiments. In this respect, the case of Norway is perhaps somewhat unique.

The large hydropower resources had turned the national control issue into focus at an early stage. Already in the early years of the century, efforts to obtain such control provided the country with a highly specialized concession law system which secured political control at both municipal and state levels of administration. This system has later been subject to broad and fairly stable political consensus. For instance after the discovery of large oil- and gas resources in the North Sea, the hydro-power concession system became copied in order to provide a similarly strong national resource control and state governance system towards the “new” energy resources. This broad political consensus on the national resource control issue, gave the market reform approach a distinctive Norwegian stamp.

Also the features of the nearly 100% hydro-power based system separates the Norwegian case from those of most other countries. In particular the early establishing of an internal, market based electricity trade system for generators which became established to solve a specific coordination and efficiency problem within the decentralized hydro-power system, provided a unique point of departure for an entrepreneurial market reform collective. The existence of a “quasi market system” during the 20 years before the 1990 market reform, also provided an institutional, collective cognitive and pragmatic basis from where to expand competitive market concepts. In this perspective, Norway offered a case with a relatively “short distance” from a pre-market to a competitive market system.

Second, we may conclude that the Norwegian case may offer a typical case in terms of the making of a new market system. The Norwegian market reform can primarily be seen as a re-framing and restructuring of the integrated “Edison central station system” so that some of its functions became framed as “system-internal” markets. The reform was not about ownership or resource control, but about governance system, about prices, trade systems, investments and economic efficiency in a national resource allocative perspective. Quite on the contrary, the prevention of unwanted “spillovers” from the new competitive market system to the national resource control issue was a vital political concern – and it still is. The problem is that the competitive market model is theoretically and ideologically connected to private property rights for reasons spelled out for instance by Ludvig von Mises and Friedrich Hayek; mainly “the economic incentive of private capital owners” type of argument. The establishing of a competitive market brings along with it scientific and ideological arguments for privatization – which in a world with free equity markets might rapidly undermine traditional national property control rights over the hydro-power

resources. The Norwegian electricity market reform is accordingly in a crucial sense a hybrid similar to the ideas of Ota Sik; a competitive market shaped by economic theory within a hierarchically and politically controlled system. In the longer term however, the stability of this hybrid will be put to severe economic and political testing. Already, we see clear tendencies towards a larger role for the equity capital market in the system.

On the other hand, efforts to establish a market in a situation where neither the categories of actors nor institutions seem to fit, has provided us with an outstanding opportunity to test the hypothesis that the functioning of markets does not result from pre-given, stable features of economic actors or from pre-given social institutions, but from a process in which actors and institutions are being acted upon; re-framed, disentangled, educated, re-structured, configured and re-formatted by dedicated market making entrepreneurial collectives. Because of the apparent institutional and agency “contradictions” which results from the molding of inconsistent cognitive models, we have also been able to investigate into some of the many problems and mutual transformations involved in processes of creating and expanding a new market system, on which basis we may try to generalize a few insights.

14.1.1 Why and how Norway became a hotbed for electricity market reforms

The overall explanation of why and how Norway became one of the first to carry out a radical market reform in this area, is derived from a triangulation of four different perspectives.

- One focussed on a variety of entrepreneurial collectives with different reform programs, who aimed at improving the economic efficiency and rationality of the sector in between 1960 and approximately 1985.
- The second focussed on developments within economic thought and within economic policy-making internationally since the late 1960s, and followed these influences to Norway, through the credit market reform and the new public management program enforced by the conservative and the coalition governments in between 1980 and 1986.
- The third turned the attention towards the electricity sector research activities headed by Einar Hope at NHH in Bergen, and the emergence of the SAF research institution.

- Finally, a fourth perspective was obtained from a focus on the roles of Tormod Hermansen, the 1986 Labor government's modernization program, the Ministry of Finance and the role of the Steigum Committee in initiating the electricity market reform.

Together these perspectives provide the main empirical elements to my explanation about the breakthrough for the electricity market reform.

My first argument is that the market reform alternative became possible because of the failure of existing alternative reform programs to create sufficiently decisive breakthroughs for their alternative programs. What I have called "The Hveding system design collective" made important contributions to the electricity system by introducing scientific electricity economics in the tradition of EdF, by enforcing the establishing of the "occasional power market" for electricity generators, by constructing an integrated simulation model for the entire electricity system as a new system design governance instrument¹⁷⁷, and by pushing for an integration of the Norwegian hydropower system with neighboring thermal power production systems. But, it did not manage to create a decisive breakthrough for a scientifically guided pricing and investment practice based on the LRMC principle advocated – not a least because of the critique from the economics profession at this point. The economists on their side, fell short of developing an operational alternative which would have made it possible to apply their preferred SRMC pricing principle instead.

Another powerful entrepreneurial collective was dedicated towards the introduction of atomic power. A breakthrough for this program would have shaped energy legislation, industrial structures and the political agenda in a very different direction. As it turned out, the collective broke down for a multiplicity of reasons - one of which was the strength of local resistance towards locating atomic power plants in their neighborhood, which resulted in part from NVE's efforts to fulfill the requirements of the new area planning legislation. Its most significant contribution to our story in the end, appears to have been the initiative by parliament to work out a new energy legislation. This put a legislative reform on the track already in the early 1970s.

The third reform program at the time was the hierarchical restructuring approach which aimed at reshaping the electricity sector into a hierarchical order partly influenced by the French EdF, partly by large American utilities.

¹⁷⁷ Known as the EFI-model.

The program was institutionalized by the Labor government in 1960 and was driven primarily from the NVE's E-directorate, associated with Gunnar Vatten, Asbjørn Vinjar and Erling Diesen. The program met stubborn opposition from local cooperative interests, and in particular the state-county model advocated by Vinjar became a target for attacks from the established cooperative and federative public sector organizational systems through out the sector. These had managed to reinforce their positions after the breakdown of an ambitious hierarchical program in 1922 as well as during WWII, when the cooperative system became a national defense line in the face of loss of control with state institutions. The result was a slow process of restructuring of the sector by any relevant international comparison, largely advancing through general restructuring of municipalities into larger entities. A radical hierarchical reform was rejected by parliament in 1980 and turned over to the Energy Law Commission, which came up with a moderated compromise in 1985 – at a point of time when state-hierarchical models had been substantially politically discredited in general.

To sum up this argument, I would say that the openness to a market oriented alternative within the electricity sector did not follow from any severe crisis or failures within the established system to adjust in reasonable ways to immediate perceived problems - like for instance the excess generating capacity problem in the early 1980s and the associated price differences between occasional and firm power in the early 1980s. It rather followed from the failure to generate powerful improvements in *the perceived economic rationality* of the sector as compared to the electricity systems in other European countries. The lack of any decisive breakthroughs for any of the entrepreneurial programs in the 1970s and -80s left frustrations in different camps – which opened up for some alternative route¹⁷⁸. The mechanism of change was not primarily one of real life economic testing, but one of efforts to solve specific problems from the perspective of economic theory, to outline different solutions and to overturn the established order by means of a specific program for the shaping of the future system.

My second argument is that the market reform alternative came to represent the operational alternative to the theoretical arguments put forward by the economists already in the 1970s. The shaping of the program in part resulted

¹⁷⁸ It is also interesting to note that all the different alternative programs at the time - except the environmental - had economic efficiency as a major purpose, however shaped by different interpretative categories, models, technologies and logic. They were all economic in this basic interpretation.

from the international reorientation towards deregulation and markets, and in part from Einar Hope's empirical research on the functioning of the occasional power market - including efforts to solve immediate problems to actors operating in this market¹⁷⁹. From there, it expanded through a number of economic research projects at the SAF which both addressed a broad range of empirical questions and efforts to acquire and work out relevant theoretical knowledge. The specific organization of the SAF research institution as a collective institution for NHH researchers, was an important element in the networking system in which the market reform collective emerged. It was the aggregation of this work and these organizational structures which generated a scientific and later on, a pragmatic, operational reform alternative.

Finally, there is a line of argument from the international reorientation of economics and economic policy-making to early initiatives for a credit market reform in Norway in 1977/78, through the new public management program which among other things resulted in the restructuring of NVE in 1985/86 in which Statkraftverkene became separated as a semi-autonomous, somewhat more business oriented state company, to the efforts to modernize the labor party and to the tight cooperation between the Ministry of Finance and economists at NHH represented by the Steigum Committee. This line of argument at the same time follows Tormod Hermansen from his early cooperation with Einar Hope at the SAF in the early 1970s, through his position as an assistant minister to Per Kleppe in the Ministry of Finance during the early part of the credit market reform, through his important role in carrying out various new public management programs in the early 1980s to his new position as the administrative leader of the Ministry of Finance from 1986 to 1991. Hermansen in several ways played core networking roles in several market oriented reforms within the frameworks of the public sector through the period - including the efforts at modernizing the Labor Party in between 1986 and 1989. Under his leadership and the initiatives of the Steigum Committee, the electricity market reform became mobilized as a political-administrative reform in a cooperation between the Ministry of Finance, the NHH economists and the Einar Hope electricity market reform collective at the SAF. As such, the reform became a major representation of a broader program for economic reform represented by the NHH economists and the Ministry of Finance under the Hermansen leadership - backed by the AP leadership/government, but without broad support from within the party.

¹⁷⁹ In itself, this activity can be seen as one of the many local projects hooked on to the international "circulating reference" associated with market reorientation at the time.

Another important feature of the reform, was the absence of close links to deregulation processes in other countries. These of course caused inspiration in broad as well as scientific and political “backing”, but the actual development of the reform program was primarily based on Einar Hope’s empirically oriented IO-SCP tradition. This, I believe, substantially strengthened the ability of the program to tailor-make a new system based on pragmatic applications of economic theory to the complexities of the historically established Norwegian system.

I have also argued that the new governance system was largely added to existing governance systems and provided substantial roles not only for competitive actors, but also for hierarchical governance and control in line with the Oskar Lange/EdF tradition. This was in particular true in relation to the electricity network system where most of the employees within the sector are engaged. This provided for an ability to transform also the NVE based part of the hierarchical restructuring collective, who came to play an important new role as the state regulator in the shaping of the new market system.

These diverse events explain why the electricity market reform program managed to emerge as a viable scientific-political-administrative reform alternative. From there, I have argued that the breakthrough for the market reform followed partly from the unique powers of economics to shape conceptions of what is economically rational and efficient, from the construction of a visual representation of the market system in the form of a comprehensive research report, from the molding of the program to fit with the national resource control consensus and the locked-in powers of the local cooperatives, from the complex networking activities carried out by the Hermansen market reform collective within the state administration, from strategic maneuvers in parliament and from the substantial information activity carried out by Hope and his colleagues through out the electricity sector during 1989.

However, other representatives of the Labor Party managed to force the government to go for the hierarchical restructuring reform represented by the 1985 Energy Law Commission, and a decisive breakthrough for the market reform alternative only became possible because the outcome of the parliamentary election forced the Labor Party to withdraw. In the new coalition government, Minister of Petroleum and Energy, Eivind Reiten, ensured the necessary political alliances with both the power intensive industry and the local cooperative systems represented by his own party “Senterpartiet”, behind the marked reform alternative.

Many features of the new system were however still open to controversy, and the actual shaping and stabilization of the market system resulted from a stepwise resolving of and carrying out of a multiplicity of change projects during which the market reform collective managed to maintain fairly tight controls with the process, and to shape the various parts of the system in line with its theoretical principles and its initial operational reform models. The most important exceptions from this picture, was the state takeover of the power pool from the collective of generators represented by Samkjøringen and the “failure” to restructure ownership within the electricity network system in accordance with the natural monopoly theory. It was only after the settlement of and the carrying out of these many change projects, that the new market system became stabilized and irrefutable to those who opposed to the whole idea or to some specific features of the new system. Through these many projects, the new market system became locked into the sector by an aggregated, durable system of domination of power which partly forced, partly induced actors on the outside of the entrepreneurial collective to get on the inside and thereby expanded the reform program through out the sector. The process of stabilization accordingly had elements of both purpose, of choice, of chance and of a successive strategic shaping of necessary pre-conditions for further expansion and stabilization process.

14.1.2 The stability of the electricity market reform, and some of its future challenges

At the end of the 1990s, the Norwegian electricity market system appears to be a highly robust economic system, still in transformation towards more competitive and more “economically” governed structures and behaviors. Piece by piece the traditional public sector cooperative and federative system is being replaced by organizational models taken from equity owned firms and their related research traditions. Ownership- and managerial controls are increasingly being separated. Municipalities behave more and more like equity owners who extract dividends from their firms, adjusts capital structures to tax rules, sell out their electricity companies in order to transfer capital to other purposes, or buy other companies in order to gain more advantageous commercial positions. Disentangled electricity network companies integrate regionally through mergers and acquisitions. Electricity trade is increasingly dominated by professional traders operating on a non-relational basis in sophisticated electricity trade systems, and consumers to an increasing extend shop electricity across suppliers in fairly simplistic ways. Competition seemingly works and the hydropower resource base is still under tight national control through continuous public ownership and state legislation. Not many really doubts whether the market system fits or not. It certainly does – as many of its different elements have been rearranged so as to become fit.

In the meantime, the EU Commission has strengthened its efforts to deregulate the European electricity industry by pushing an ambitious program for competition and by stepwise adding new regulatory instruments and capabilities. Denmark and the Netherlands are about to embark on general market reforms and electricity exchanges are being introduced also within regional power systems in Germany. Spain introduced a new market oriented legislation in 1997. Even the French EdF seems to be backing off as a result of recent moves by the Commission. The market system is obviously in a state of European expansion.

Yet, there are of course real life tests of the Norwegian market system that have not yet come to the surface. One of those is “the capacity expansion test”. Due to the inherited over-capacity established in the early 1980s and the access to foreign thermal power systems with excess capacity, investments in new power generating capacity in Norway have steadily declined from a capacity of 9,5 TWh licensed and under construction in 1980, to 5,2 TWh in 1985, to 3,5 in 1990 and only 1,7 TWh in 1997¹⁸⁰. The country is currently a net electricity importer as the expected average production capacity is 113 TWh where as gross consumption is around 118 TWh. The still large volatility in prices from year to year, appears to have caused substantial uncertainty and sort of a “go-stop-go-stop” impression of investment projects. Also the very political character of investment decisions and the conflicts with the environmentalists over large gas turbine projects and the carbondioxide emission regime, complicate the relationship between market signals and actual investments.

However, given the expansion of an open international market for electricity, investments that are not forced by environmental regulations like close-downs of nuclear power plants, are likely to be small in generation and somewhat larger in transmission capacity in order to expand trade opportunities to exploit available capacities and benefits from the integration of different technologies and regions. In this situation, investments in the Norwegian system is likely first and foremost to reflect the new role of the Scandinavian hydropower system as a peak load provider to the larger North-European thermal power system. Because these investments primarily will take place in the market infrastructure natural monopoly system, electricity engineering (system design engineering) is still in operational command to direct a large share of actual investments towards those alternatives which add the more efficiency to the overall system rather than to alternatives which provide the more profits to individual project owners.

¹⁸⁰ Central Statistical Bureau (SSB), Electricity statistics, 1996

Whether the generating capacity expansion test will also be successfully passed, accordingly remains to be seen.

There are certainly also important tensions within the new system which relates to some of the core blackboxes of the market system – like the interpretation of and the shaping of the point tariff system, the extension of the national grid infrastructure system and the political versus commercial role of municipalities. Any forced opening of the simplifications which serves as major building blocks in the market system, potentially threatens to undermine the stability – or the lock-in - of the system. Or it will induce major changes directed by new blackboxed concepts. An important direction of development in the latter case – appears to be a gradual reframing of the interpretation of the natural monopoly concept in combination with a continued creation of competitive systems related to the many functions of the electricity network system.

14.1.3 Some implications for other market reform projects

In the European perspective, the Norwegian electricity market reform represents an important point of departure for a process which is expanding from the north towards central Europe. As noted in the introductory, the “Nordic model” has become quite influential as an approach to market reforms in several other countries, based on its “deregulation without privatization” approach. I find that there are a few insights from my study which might have some value to those engaged in such reform initiatives.

First, it should be noted that a market institution established from basic concepts within economic theory was introduced in the Norwegian electricity system already in 1971. Even though it was a closed market for generators, it permitted practitioners through out the industry to gain substantial experience and familiarity with a competitive market trade system before the radical expansion of the market nearly 20 years later. It also established basic concepts such as “third party access” and “short run marginal cost pricing” as stabilized principles within the national trade system. Through the efforts of Hveding and his system design collective to link thermal power plants to the Norwegian hydropower system, Sweden and Denmark also became associated with the internal power market – even though with Statkraft as an intermediate. To establish an operational internal power exchange system or to get access to such a system may be a useful, pragmatic way of getting the process started – rather than to embark directly on the political process needed to force changes through legislation.

Second, it can be noted that the reform emerged out of a large empirical research program in which economists

- 1) gained substantial in detail knowledge about the electricity system and its practices,
- 2) engaged in practical trouble shooting and innovative activities to improve the efficiency of specific elements of the system,
- 3) established additional research projects in which broader theoretical problems became addressed and linked to the empirical problems studied and
- 4) mobilized a network of colleagues capable of translating, mediating and applying basic economic concepts as well as a wide range of new contributions from within economics.

Together, this permitted for the ability to work out an alternative system on the basis of relatively moderate institutional changes in the existing system. This suggests that it might not be a good idea to copy somebody else's system. Rather one should find operational solutions through iteration between empirical studies and theory – and then apply elements developed elsewhere where it might fit into an operational re-framing.

As a third point it should be noted that the reform process was intimately tied into powerful locked-in features of the Norwegian system. These had become established through the maintenance and reinforcement of durable systems of power established by historical entrepreneurial collectives within the sector as well as within the political community. The reform became possible because the scientific economic reform program through political mediation became framed in such a way as to respect the most basic political stronghold; national resource control. It furthermore became possible because the program provided sufficient links to powerful hierarchical networks within the sector and thereby avoided multiple frontlines.

Also the rapid, incremental and in part “irrational” political decision process was important in the sense that it did not open up the stage to a possible mobilization of powerful opposition and multiple, simultaneous frontlines. This permitted the entrepreneurial collective behind the reform program to add new elements to their program through the process and thereby increase its capacity to overturn resistance from rival collectives. It also served to reduce complexity, to concentrate powers in order to force decisive breakthroughs and to generate solutions to problems which “popped up” along the way through sequential innovative activities.

Finally, it can be observed that the apparent success of the Norwegian market reform in terms of its stability and its reshaping of real world

industrial structures, organizations and economic agents, was crucially dependent on the success of a large number of specific reform projects in which concepts from within economic theory were applied to reframe, re-configure and re-format all the various parts of the system in accordance with the re-framing represented by the overall program. Through these innovative projects, new concepts from within economics became applied so as to radically increase the capacity for economic regulation and control through out the system. The case demonstrates that through collective cognitive re-framing and the introduction of new governance technologies and concepts, economic behaviors can be fairly radically transformed – without any substantial privatization of property rights. This suggests that from the point of view of a state which does not hold major property rights within its public sector electricity system, there is no particular sense in directly confronting property rights holders. Deregulation without privatization may be a more powerful and less constrained approach than generally believed by economists.

In the more Norwegian perspective, we should be prepared to recognize that the specific system we have established is both tied closely into the uniqueness of our history and the uniqueness of our hydro-power electricity system. The market reform emerged in an effort to expand and reshape a unique internal electricity trade system which had become established to solve a very specific problem in a hydropower system within a semi-structured and fairly decentral governance system.

Countries with systems based on other technologies and resource bases and with different organizational structures inherited from history, are likely to be better off with systems that are specifically designed from the uniqueness of their own system rather than from copying ours. This does not mean that we should not give advice on the basis of our experiences. It rather implies that we should have tremendous respect for the differences and the specific challenges others will have to cope with – in which elements of our system might or might not fit in.

As a contribution to the understanding of market reform processes in the very general perspective also discussed in the introduction of this thesis, there are a few additional things to be said. It seems to me that the ability to create a successful market reform both depends on the quality, the institutional-organizational positions and the extension of the entrepreneurial collective in relation to their object of transformation. It seems to be important for the initiators of such reforms to be able to associate with a competent and well organized community of economists with substantial professional authority, with specialized and detailed knowledge about the object of reform – including its physics and technologies, and with

competence on or access to a wide range of economic theories needed to innovate and tailor make appropriate and powerful solutions to many different parts of the system.

It is also important to establish close ties between such an economics community and actors in commanding height positions towards the object of reform. This might very well be in the state administration, but may also origin elsewhere – like in large companies, sector organizations, political parties and the like. These may have to adjust the juxtaposition of simplified elements in the economic program in such a way as to make it politically feasible, to reshape it so as to be able to associate with powerful networks of actors needed to carry through the core of the program. Such an adjustment might even contain the rejection of concepts within economics – such as the role of the state or of private property rights. Such an alignment necessitates hands-on, competent strategic and political leadership with access to a multiplicity of networks.

The ability to create a decisive breakthrough for and stabilization of a radical economic reform, not only depends on clear cut theoretical framing, adjustments to present circumstances, the production of visual representations and access to the relevant commanding heights. It is also dependent on the education of delegates on which the expansion of the program on the outside of the overview and control of the reform enunciators can be based. These delegates are needed to bring the program into the vast number of local activities, to ensure local support and transformation in accordance with the purpose of the reform program. Without a large number of delegates distributed through out the system, actors are likely to enter and leave the program in for the entrepreneurial collective unpredictable ways. They might also reject the roles they are given and mobilize substantial efforts to undermine the new program, or they might reshape it in order to exploit it for purposes not consistent with the program. Over time this is likely to cause a breakdown of the reform from lack of transformative capacity, seemingly irrational or uncontrollable behaviors and unmanageable complexity.

Education and distribution of a large number of trusted delegates of this type, by necessity takes time. If they are not already there, the chance of a radical economic reform to stabilize in the short run is likely to be small. This suggests that in the case where a sufficiently extended entrepreneurial collective is not available in the short run, an approach where you embark on more limited, stepwise reforms in which you both produce visible representations and educate delegates are likely to be a more successful alternative - both in the short and in the long run.

Finally, in this very broad perspective, it might be noted that traditional arguments from market economics and business strategy literature about the lack of innovative capacity within the state, may be at least partly rejected. When it comes to re-shaping industries and force them and their actors to become more efficient, state officials may be just as innovative as private businesses. After all, states are agencies for collective national economic interests and are sometimes instructed to behave accordingly. They might even employ individuals with impressive innovative and networking capabilities.

The idea that states have no significant roles to play in open, international competitive markets, is accordingly just as misguided. In particular the opportunity for tight alliances between scientific economic communities and networks of actors within the state administration, may turn out to be a tremendously potent alliance for economic transformation. The economists have access to an enormous international production of economic governance models and technologies as well as to the education of a large number of delegates. State officials provide access to unique state powers. It certainly takes lots of international market forces to generate an equivalent of transformative powers towards local behaviors.

14.2 Medium range theoretical findings and suggestions

In broad terms, I find that the actor-network theory provides a both flexible and powerful analytical apparatus to analysis of economic change, industrial transformations and in particular the emergence of modern market economies. Rather than adding concepts such as of social networks to a theory of markets, it holds the capacity to explain the interaction of such concepts with the economy as a major characteristic of the shaping of economic systems, -organizations, -agents and -practices. That is, it takes as its object of study also the interaction of economics in broad with the economy. As such, I find that it represents a more appropriate and powerful approach than “the social construction of the economy” alternative represented by McGuire, Granovetter and Schwartz. A particular strength is exactly that it does not start out from any stabilized conceptions of either individual actors, collective structures or institutions, but rather starts from the interaction of purpose formation, language and concept creation and human discourse in which new concepts and ideas are being born. Rather than providing a privileged explanatory status to either individuals, interpersonal relations or institutions, the theory opens up to the study of the interaction of actors and networks of different kinds associated with those hybrid entities that are engaged in the remaking of society in some way or another.

I think that my study on several occasions confirm the importance of interpersonal networks, but only in as far as they concern the purpose of their joint projects. Relationships between theories, between organizations and institutions and between positions were also important in a similar interpretation.

Also the often articulated essential role of entrepreneurs is confirmed – both as the initiators and inventors of the simplifications and juxtapositions which make up their programs, and as the strategic directors and coordinators of entrepreneurial collectives in the larger scale. Without a dedicated strategic leadership determined to create a breakthrough for its program, the collective entities that I have studied would probably not have been able to succeed in reaching any stabilized state within the electricity sector. But leadership alone is not potent. A potent leadership capable of creating decisive breakthroughs, is dependent on its access to and relations to devices, concepts, institutions and networks by which to aggregate persuasive capabilities – by which to extend their range of operations.

14.2.1 The role of economics in the economy

Economics and the economics community offers a tremendous amount of such concepts, theories, networks and institutions to entrepreneurial leaders oriented towards economic and industrial improvements and changes. These are generated from the interaction of economists with the economy world wide and from the iteration between theory generation and practical problem solving at levels ranging from international credit, monetary and equity markets through national, sector and organizational trouble shooting to the adjustment of operational routines and specific incentive systems at very local levels of operation. As such, main stream economics is more about performing the economy than about explaining it. A major purpose is to help improving economic efficiency in society. It should accordingly be of no surprise if powerful entrepreneurial collectives engaged in the reshaping of a sector of a nation's economy, emerged from within the middle of the scientific economics profession itself.

14.2.1.1 Economic efficiency as a purpose of the future or as a test mechanism?

Rather than assuming that a market based system succeeded because it was the more efficient in an immediate sense, my analysis demonstrates that the immediate success of and the stability of the reform followed from the construction of a persuasive alternative derived from economics, from its support from scientific and state-administrative networks, and from its mediation through political adjustments so as to align it with major locked in features of the established system. Success followed from the activity of

these networks to transform the many different elements of the electricity system in a strategic way through a multiplicity of interrelated reform projects. Only when these many projects had produced substantial new structural, institutional and cognitive circumstances within the sector, the stability of the market reform became irrefutable. Through these many projects, what was perceived of by the enunciators as more efficient in theory, gradually became transformed into a stabilized real life system where its actual efficiency could be tested in the overall market economic and political systems.

Economic efficiency is thereby found to play two distinctly different roles in economic transformations. One relates to the real life testing of what has become stabilized as either industrial systems, organizational systems, trade systems, behavioral systems etc., commonly referred to as the market selection mechanism. Here profitability and prices to consumers play essential roles. However, the mechanism is not one of functional selection, but one of testing the stability, “the holding together” and the problem solving capability of program specific collectives. The other role rather relates to economic efficiency as a purpose of the future. What is important here, is the ability to turn into reality what starts out as a specific framing or program for the advancement of economic efficiency in some sense. Here, economics as ideology - in the words of Bromley – becomes important as well as its scientific or argumentative persuasiveness.

This second role was essential also in the Edison versus Morgan case discussed by McGuire, Granovetter and Schwartz. It was the success of Edison in persuading European investors about the long term economic efficiency superiority of his large scale central station approach, and his production of networks and delegates to support his program, which in the end outperformed Morgan’s approach. We must therefor reject their argument that economic efficiency did not decide upon the outcome. But, similar to their findings and arguments, the Norwegian electricity market reform case demonstrates that the ability of some economic-technological efficiency concept to outperform another, depends on its persuasiveness in addition to the construction of networks associated with it and its ability to link on to networks of actors which may use the program and its actors and collective things to advance their own projects. Industrial transformations primarily has to do with this second role of economic efficiency; economic efficiency as a purpose of the future.

But, as I have also demonstrated, the breakdown of an established economic system through its failure to pass the market test or the success of rival collectives in forcing a breakdown of its stability over time, in specific cases may serve as necessary preconditions for a radical new approach to be able

to create a decisive breakthrough. In the end, it all comes down to the relative persuasiveness of the present system as opposed to new alternatives. If a new alternative is sufficiently convincing, a radical transformation may occur without a previous severe failure or weakening of the established system. We may also infer that economic crisis may be an important point of departure, but hardly a sufficient condition for successful economic transformation. On the contrary, it may reflect a limited capability within political, scientific and commercial communities to construct and support new entrepreneurial collectives which may also prevent a new approach from carrying out the wide range of change projects needed to stabilize a new system.

The “purpose of the future” role of economic efficiency in shaping economic systems and economic activity, points at the very powerful role of economics in these processes as it constitutes the scientific area which is specifically dedicated to this issue. In particular the market reorientation which started in the late 1960s and the rapid expansion in economic and business management theorizing which followed, appear to have moved the economics profession into an even more powerful entrepreneurial position in large scale as well as smaller scale economic and industrial transformation processes – possibly at the expense of the engineer profession. This appears not only to follow from the increased role of market competition in the economy which was in essence the outcome of these processes. It also follows from the increased capability of economics and the economics community to produce economic system alternatives where economic efficiency as well as governance controls have in fact been substantially improved. The increased powers of economics can accordingly be traced back to the rapid growth in the production of economic theory, economic governance models at both state and firm levels, economic measurement systems etc.

14.2.1.2 Economics as a devise for the destruction of social relations and for the shaping of economic man and economic agencies

Powers, interests and social networks are changeable phenomena just like the economic systems they are thought of as the directors of. In order to explain economic change, we have to account for these changing phenomena as well. What we find then, is that a new framing within economics supported by constructed new concepts and capabilities, provided for new links to economic governance actors such as states and firms. These new networks of actors, concepts, governance technologies and institutions gradually generated breakthroughs for systems which forced social structures in trade systems apart and turned them into non-socially related trade systems similar to concepts within economic theory. Modern

economics may thus serve as a device which dissolves social networks traditionally embedded in markets and turns economic actors into “atomic entities” calculating their individual utilities, and economic agencies into systems where their individual actors are surrounded by a multiplicity of governance systems as well as formatted so as to behave more strictly in accordance with the economic objectives of their controllers (principals). They became “undersocialized” or “oversocialized” to use Granovetter’s terms¹⁸¹, through the tremendous formative capacity of economics itself.

The two different roles of economic efficiency implies that economic actors analytically can be separated into two different kinds. One is represented by the actor within entrepreneurial collectives who is engaged in reshaping economic systems, technologies, economic agencies and economic behaviors. The other is represented by the one acted upon, the one to take on the form of “a rational economic man” as described by economic theory - as a preferred outcome of the transformation process. Economists engaged in such reform processes do not themselves necessarily behave in accordance with the commonly expressed “economic utility” oriented concept of economic man in economic theory¹⁸². Rather than being directed by individual economic gains, they are primarily engaged in shaping economic systems in accordance with their beliefs, their unique knowledge and their common theoretical models and methods. They engage on behalf of their professional community in entrepreneurial, innovative re-making of industry and economy projects.

This does of course not mean that economists may not serve in the role as “rational profit oriented economic man” or that economic practitioners never take on the entrepreneurial role. In fact, practitioners often form entrepreneurial collectives in which economists engage on the basis of individual economic gains, for instance as business consultants.

14.2.2 Path dependency, de-locking and mechanisms of radical industrial and economic change

The theory of path dependency has been broadly embraced by economists within the institutional camp. There are however, different versions of this

¹⁸¹ Granovetter, 1985

¹⁸² Any choice or behavior may of course be described as consistent with some specific utility preference function of an individual – as the concept is based on an analytical (tautological) statement. What is referred to here, is the more “popular” version based on monetary gains.

theory which more or less explicitly draw on different types of basic explanatory arguments, ranging from economic efficiency to power to the broad holistic versions. I have argued in the theoretical introductory that the economic increasing returns argument may very well be correct, but that its explanatory capacity is unsatisfactorily small. This problem both relates to the actual creation of a lock-in, to the maintenance of it and to the eventual de-locking in the form of some kind of revolutionary change. The actor-network concepts in my view provides a more adequate and comprehensive approach. To me, the concept of translation in combination with a concept of power, where power is defined as the aggregated chain of elements (loads) in durable systems of domination, has been particularly useful in this respect. They describe what is involved in the creation of decisive breakthroughs and maintenance of predictable behaviors within industries.

We may now rewind on a couple of additional insights into the path dependency phenomenon. First and foremost, we may conclude that entrepreneurial collectives with programs in which economic efficiency or profitability plays a major role, provide a direct link between the increasing returns argument and the dynamic power argument. This follows when the establishing of a lock-in through a decisive breakthrough for such a collective, provides the opportunity for rapid and extensive transformations of its environment and for stabilization of economic concepts that are believed to increase economic efficiency or profitability. Given the breakthrough, increasing returns are likely to follow from a rapid expansion of these concepts. The power argument and the increasing returns argument in this case becomes two sides of the same coin. The mechanism of a lock-in creation can be understood from the dynamic power argument as the more basic concept, but where economic efficiency or profitability as a purpose of the future in the special (economic) case plays a very essential role in the creation of, the maintenance of and the breakdown of such powers.

Second, the different historical entrepreneurial collectives discussed throughout this thesis, demonstrate that de-locking may occur in different ways – for instance depending upon the extent by which established locked-in systems have been de-stabilized by real life economic tests, from external shocks like wars or severe economic crisis or by efforts from rival entrepreneurial collectives to undermine their stability. The capturing of and re-shaping of the relevant commanding heights within the state administration was perhaps the most typical route to a radical takeover by some new program – like the post-war large scale state-industry program, the hierarchical restructuring program, the Hveding system design program and the market reform program.

However, the de-locking usually also had a character of strategic association between a well established historical collective and an emerging entrepreneurial collective which permitted the new collective to establish their concepts, principles, measurement systems, technologies and devices in order to address a large number of the locked-in collective things more or less from within the sector and at a local scale. Rather than confronting locked-in systems jointly and directly, there was a search for a basis for association, and for the establishing of passage points for what we may call "Trojan horses" – exemplified by the concept of the state-regulator in economic theory and the accounting reform. The actual de-locking followed from the aggregated effects of the diverse changes induced or forced by these Trojan horses in combination with the programmatic statements of the new collective and the aggregated system of loads at its disposal.

We may thus conclude that a powerful strategy for radical large scale economic reform – apart from constructing representations and elements of a durable system of powers – has to be concerned with purposeful de-locking activities, which typically would take the form of a search for possible points of entrance through which constructed elements of the program can be strategically placed within the existing locked-in system. By relating to these "Trojan horses" and by adding loads and additional elements to them, sequential reforms and changes becomes possible. This in turn both destabilize - or obstruct - the locked-in system and add momentum to the change program. It seems to me that the power of the sequential strategic approach exactly has to do with this simultaneous de-locking and momentum-generating-through-partial-transformation character of radical change processes.

14.2.3 The trajectory of a large scale economic reform

The electricity market reform has been described as a process which passed through several stages. However, it does not support the idea that some specific sequence of events can explain the outcome of later events in some direct mechanical sense. It rather suggests a different version of necessity. Specific elements, which can be conceptualized in general terms, serve as *necessary conditions* for certain later events to be able to occur. Both purpose, choice, chance events and necessary preconditions seems to be important aspects of industrial and economic change (Mandelbaum, 1987). First, let us summarize our findings of conceptual elements in the trajectory of industrial transformations towards "improvements in the methods of doing things".

First of all, someone had to *shape the program and an initial collective for its expansion*, to get the idea, to formulate a re-framing as well as a program

for the re-shaping of the particular economic activity, and to mobilize and organize actors and resources in order to expand the program. I have shown that Einar Hope and his colleagues at NHH/SAF played a particularly important entrepreneurial role in creating an scientific market reform program, in line with basic theoretical arguments which had been represented by the economists for some time. This program emerged out of a research program oriented towards finding opportunities for structural and operational improvements in the electricity economic systems, out of empirical research on the functioning of the occasional power market and out of iteration with economic theories expanding world wide at the time. The structuring and the formatting of the SAF research institution in relation to the NHH on the one side and state governance institutions on the other, also played an important role in the advancement of the program into an *extended research network* and into becoming a core element in a *more extended scientific-political network* which aimed at furthering the market reorientation process in the Norwegian society.

Second, the reform depended on institutional control over the relevant *commanding heights* – in this case primarily within the FD, the OED and the government – and thirdly it depended upon efforts to *construct a persuasive representation of the reform alternative*. The representation can be seen as a “semi-ontological thing” representing the final real life system in the form of descriptions, scientific arguments, operational solutions and strategies for implementation.

Fourth, one had to *mediate the program so as to become politically feasible*. The constraint not to touch property rights both aligned the economic program with the national resource control issue regarding which there was a strong historical consensus, and narrowed the gap between the reform program and core concepts represented by the established cooperative systems within the sector. This provided opportunities for necessary political alliances against the major rival; the hierarchical restructuring program.

Fifth, one had to *produce a decisive institutional breakthrough* which made it possible to mobilize substantial more powers and resources behind the reform which partly forced, partly induced sector actors on the outside of the market reform collective to get on the inside. In this case, the approval of the new market oriented energy law provided such an institutional breakthrough. As demonstrated, the breakthrough had both elements of strategy and chance.

Sixth, the reform collective had to *re-configure the core elements of the industry* by re-structuring state governance institutions and the state electricity company. It had to re-arrange their objectives and employ trusted

delegates in command positions to direct the further transformation process. Through this re-configuration, the NVE strengthened its role in the system, its governance legitimacy and piece by piece its operational governance instruments. Statkraft became separated and stripped for most of its unique system roles. Somewhat by political “accident”, the power pool and power exchange system became organized as a state subsidiary where as Samkjøringen which was intended for these tasks, became dissolved. Electricity companies through out the sector were forced to change their economic measurement systems and to separate their accounts in accordance with the accounting reform and later in accordance with a large number of specific regulatory systems based on the new accounting system.

And seventh, *detailed operational governance systems were developed and applied* which partly forced local actors to behave in specific ways and partly added momentum to a broad re-formatting of collective cognitive patterns within the industry, which gradually changed interpretations of organizational objectives, economic rationality, distribution of roles, property rights and appropriate economic interaction with economic counterparts and economic regulators.

Hence, *re-framing, program shaping, network building, program modification, power struggles, institutional breakthrough, re-configuration, delegation, sub system reforms and re-formatting of collective cognitive patterns* all represent important elements along the pathway of industrial transformation studied. Through these many activities by a dedicated entrepreneurial collective who took advantage of an historical opportunity in the 1980s, an industrial sector of the economy characterized by substantial historical lock-ins has been radically re-shaped over a period of less than a decade.

14.2.4 Purpose, trust, choice, chance and necessity in industrial change processes

Why is the role of purpose so important in the process presented? First of all, the problem which we encounter is that in order for something to be chosen and implemented, it has to be of a sufficient “degree of reality”, and to represent a relatively credible and legitimate alternative in terms of future outcomes to choice-makers in command positions. Purposeful constructions of alternatives is accordingly vital to the capacity for translation (enrollment). Einar Hope and his research colleagues, the SAF institution and their development of the market reform alternative in theory, formulated the purpose and created the option as well as the scientific legitimacy and authority to support it. But it also resulted from lots of dedicated work to advance an economic program; to improve economic efficiency by radically

increasing the role of competitive markets. This was also the core program of the Hermansen network within the FD, which provided a basis for a highly trustful relation between the NHH/SAF economists and the FD. Trust was based on their agreement on the content of the reform program and on their interdependent roles within the market reform collective.

As a consequence, we have to acknowledge that the act of choosing in the context we are talking about here, is not a matter of free choice. You are both choosing according to the purpose of the program you represent and on the basis of the powers it offers to you, and you are being chosen by others who strive to fulfill their own purposes, who can associate not only with the content of your program, but also with its affiliated powers.

In the end, it might be said that a major reason for the success of the market reform, was its lack of radicalism – its constraint not to touch property rights, its limited institutional restructuring approach and its sequentialism. All which made associations possible and choice and change manageable to the many actors and organizations involved. I have also found that the juxtaposition of the core elements of the market reform program permitted for associations with different types of actors, as some could mainly choose the hierarchical natural monopoly part, some the local governance responsibility and control part and still others the continued national resource control part. The actual molding of the reform program turned out to provide a variety of opportunities for alliances through their choosing of particular elements of the program – where as the sequential process reduced the number of parallel direct confrontations.

The presence of chance events also contribute to the rejection of determinism in theorizing. The market reform was not the inevitable outcome of the circumstances present at the time. On the contrary, the market reform process could have broken down for a variety of reasons. Had for instance the intersection of separated developments at any point of time been different from what they actually were, the outcome might have been completely different. One example would be that Hope's research program in fact first took on the actual form of a reform alternative after Tormod Hermansen took over as the head of administration in the FD and Erling Steigum jr. became engaged to lead the new FD think tank in 1986 for the new AP government. Both events had elements of chance. And the project nearly ended its entire history in parliament after Kjell Opseth and his associates within the AP had managed to push the AP-government to represent the hierarchical restructuring alternative. Without the outcome of the parliamentary election in 1989, we might have had a very different reform, or no reform at all - or one which provided a much more limited market development in the years to come.

Because changes occur within different institutions at least in part independently from each other and often outside the overview and influences of one another, timing becomes an important factor to entrepreneurial collectives. From the strategic point of view of rival entrepreneurial collectives, the ambition becomes to control as many of the variables as possible - or as needed - to control the process in order to create a decisive breakthrough. But because each actor-network is a historical entity with limited overview and powers, outcomes of processes on the outside might at any time enter the internal process and alter the situation one way or the other. In fact, it did all the time. Consequently, there will be variation between the outcomes of two lines of causation if they meet at different points of time. In this sense, the role of chance becomes truly crucial.

Chance obviously also apply to the role of individuals. This is opposed to the view that the contributions by individuals are determined by cultural characteristics or by the nature of society's institutions and the roles of and positions of specific individuals in such. The choice of an individual in part depends on his experiences and his associations with specific actor-networks representing certain purposes of the future. In this respect he will differ from individuals in other societies and also from within his own. The influence of some individual on remaking of society processes, to a substantial degree also depends on his status and role in society's institutions. Even though personal capabilities and representation of specific collectives are usually important to the issue of who shall occupy a particular position, each case will also contain some elements of chance. Both Hope, Hermansen, Tveitereid and Reiten were important individuals whose strategic and tactical choices turned out to have significant influences on the outcome. But the fact that they hold office at the crucial point in time, was not only an outcome of purposeful actions or established institutional orders, but also of chance events.

Necessary conditions in a dynamic interpretation implies some concept of sequential processes in which necessary conditions for some element to increase its stability as a real world phenomenon has to be established before such can happen. My presentation presents a great number of such necessary conditions, ranging from outcomes of historical processes even far back into history like the creation of the concession law system, the breakdown of the early hierarchical program in the early 1920's and the war experiences, to specific theoretical developments within economics, contributions from a program which introduced electricity economics and electricity system design to the sector governance system, large empirical research projects on the functioning of the established trade system, political and state administrative changes etc.

The establishing of the occasional power market in the early 1970's pushed by Hveding, represents the immediate and - I think - also an important point of departure for Einar Hope's reform program; for his theoretical interest in the electricity market system and for the structuring of the market reform program as an extension of the occasional power market. But, the occasional power market cannot be seen as a mechanical cause argument for its own expansion into a more complete market. It played in fact two very different roles in relation to each of the two major rival programs. To the hierarchical restructuring program, it provided the opportunity to isolate stochastic influences so that the major part of the system could be controlled as a predictable, planned and hierarchically coordinated system, whereas it to the market reform collective represented an interesting opportunity to experiment with more radical market solutions. Hence, the explanatory role of the occasional power market cannot be separated from the roles it was given by different entrepreneurial collectives.

To the actual breakthrough process, it is difficult to pin-point exactly what constituted necessary conditions for the final outcome to occur. The reason is of course that we do not know the outcome in case of any alternative events. Whether necessary or not in this particular interpretation, I would say that the substantial work carried out to inform and explain the market reform to the local cooperatives through out the country during 1989 was probably important to the later outcome. This permitted sector interests to state their positions on the rivalry between the hierarchical restructuring and the market alternatives. I am not quite so convinced that it was vital that Eivind Reiten "persuaded" his own party members to go for the reform, as they appear to have had no other realistic alternative at the time. Neither do I find any evidence that the British reform, initiatives by the EU Commission or the EU issue as such, played more than the roles of background curtains from where rhetorical arguments could be obtained.

14.3 The analytical approach; rethinking some of the basics

The analysis presented in several respects touches upon the foundations of modern social sciences and in particular upon some of the basics of economic theories which have as their objective to explain industrial and economic change or the existence of particular economic and organizational forms. To round up my discussion, it seems appropriate to reflect a little on these basics and to outline in theoretical terms the differences between well established disciplines and the approach presented in this piece of work.

The area of explanatory economic theory can in broad terms be seen as separated into two major camps. A classification typically derives from the different weights put on the role they attribute to individual rationality in the development of collective economic systems, the role of institutional inertia (or path dependency), the importance of choice as compared to constraints when explaining individual and collective behaviors, and the nature of organizations as either formal governance structures or social systems (Dosi, 1995).

On the one side we find theories with their point of departure in a specific conception of individual agents as carriers of stable preferences and capabilities. These typically support their theory by a more or less explicit reference to the explanatory capability of functional, market selection arguments, like for instance the neo-institutional economics tradition associated with transaction cost theory, property rights theory, agency theory and the like. The link between the two modes is typically some variant of Friedman's as...if proposition (Vroman, 1995). On the other side, we find the more holistic or "social" theories which emphasize collective dynamics and social and institutional structure like in economic sociology and traditional institutional economics. The most challenging controversies between them typically concern the relative interpretative merits of the different theories, all acknowledging at least some role both to motivational micro foundations and market competition and to collective system effects.

However, a more ambitious challenge would be to reframe the discussion in order to obtain a perspective and a methodology by which we could account for the multiplicity of explanatory elements and for the variability in both institutional and agency forms as well as the links between them, while maintaining accurate analytical concepts. I think this is what the sociology of science and technology essentially offers. The trick is to reject both a specific theory of economic agents and a specific theory of collective systems such as institutions, in order to obtain flexible analytical concepts about these phenomena. Next, the trick is to add the role of non-humans to the flexible concept of human actors as those elements which expands the acting capacity of actors and provide the actor and his behavior with a certain shape. The result is an ability to analyze the historical co-evolution of both human agents and collective system forms. Neither individuals with structured and coherent preferences and adequate cognitive algorithms to solve decision-action problems at hand, nor factors of socialization and preference formation in the form of some type of institutions, are the primitives of the theoretical approach. None of them exist as a-historical phenomena, but are created on the basis of conceptualization, framing and configuration – from the shaping of a purpose of the future and the attachment of and configuration of human and non-human elements to it.

The absence of any stable theory of the actor assumes a radical indeterminacy of the actor. The motivations behind his actions, his psychological shape, his capacity to act etc. are not predetermined (Callon, 1998). Without at least a handful of non-human elements, not much can be said about him. The traditional and sterile controversy between individualism and holism, between intentional actors and social structure dissolves with the re-framing into historical and entrepreneurial collectives. And, they become linked within entities that are separated on the basis of their different conceptions and different appearances over time.

When explaining such a thing as why some organization exists, economic theories may focus on the interests of the agents involved, on the tasks of the organization and on the technologies available. It may also look carefully into what existed before it came about, into the links between the organization and other organizational and institutional entities and try to tell an explicitly dynamic story about how it came into being. The radical challenge which emerge from both these approaches however, is to investigate the nature and process of emergence of particular cognitive frames, the emergence of variation in interpretative categories, in patterns of behavior, in routines to operate similar functions etc., which underlies the shaping of economic systems, organizational forms and economic behaviors, of economic interests, of individual and collective objectives, of the emergence of particular technologies and so forth. It is to account for the coupled dynamics between cognitive, motivational and collective dimensions of interest-formation, decision-making and action, possibly yielding endogenous preferences and specifically formatted institutions. A theory about these phenomena may also account for coexisting contradictory models of cognition and action in the heads of individuals, for cognitive dissonance and apparently irrational behaviors (Dosi, 1995).

With theories which start out with stable categories of either actors or institutions, it is difficult to handle these challenges. In this respect, explanatory economic theory appears to be locked into constraints which seems to derive from its foundations. A fruitful resolution may involve an introduction of new basic analytical concepts – a construction of new concepts of language. Without the introduction of more flexible and more general analytical concepts, it is hard to see how a consistent, explicitly dynamic account of how organizations, institutions and economic behaviors emerge and change over time can be provided.

The controversy between the functionalist explanation approach underlying neo-institutional economics and the intentional constructivist approach has as yet not come to any conclusive results. Either one of the two sides seems capable of undermining the argument of the other. It seems to me that this

apparent dead end also follows from the constraints of the basic analytical concepts in both approaches. In opposition to both these views, the theory of entrepreneurial collectives – or the actor network theory – provides an opportunity to reframe both arguments in such a way as to re-address their different roles in dynamic economic processes. My suggestion is that one (the constructivist) refers to the purpose of the future of entrepreneurial collectives and the other (the market selection) to the real life testing of their stability. Without some concept similar to a flexible “actor-network”, the linking of these basic ideas within the same sequence of an economic change process, seems difficult to achieve.

The concept of institutional inertia has been related by a variety of authors to the concept of path dependency. This has started bringing history into economics in very stimulating ways. However, as I have argued in the theoretical chapter, there are several issues to be discussed further. One is the relative merit of the economic increasing returns argument, where institutionally oriented economists appears to be rather hinting at some kind of a power argument. This accentuates a question about the stability of power taken much for granted in social constructivist approaches, as a major theoretical challenge obviously is to identify and conceptualize the determinants of de-locking, of major discontinuities or “revolutions” in the presence of path dependency or path dependent dynamics. Without a dynamic concept of power – or alternatively to those who prefer the economic argument; a dynamic concept of economic efficiency gains from lock-ins – it is difficult to see how radical de-locking of locked-in phenomena can be explained.

It seems to me that the absence of a theory of the actor in combination with the added role of non-humans is a combination which may contribute significantly to explaining the existence of and the functioning of modern market economies and their economic agents. Any organized market system is the result of concept-formation, of separation of categories such as goods, sellers, buyers, market place, money, numbers, algorithms, etc. and of the distributions of specific concepts of language and technologies. It is a result of specific framing, of externalization of non-market categories and re-internalization of such categories in the form of monetary equivalents. It is the outcome of institutional power-constructions, of the creation of measurement systems, governance technologies and other loads of persuasion which make the behaviors of actors predictable and “rational” within the framework which has guided the formative process. Without these activities, markets in their modern forms cannot exist. The making of the Norwegian electricity market through the work of Einar Hope and his colleagues to improve the functioning of and the economic rationality of the existing system, provides a number of insight into these diverse activities.

The actor-network analytical concepts make it possible to explain the operations involved in the historical shaping of the economy as well as the emergence of “Homo Economicus”; the rationally calculating and utility maximizing human agent which thereby come to exist in real life. He is neither an abstract invention nor an abstract vision of a real person, but the outcome of a formative process where economic science plays an important role. If agents shall be able to behave in preferable ways from the point of view of economic efficiency, it demands clear and precise boundaries between relations to be taken into account in their calculations, choices and actions, and the many relations which will be ignored. Hence, the externalization of “non-economic” issues in Hope’s market reform project – the cleansing of the “irrational systems and behaviors” of the previous system for political, redistributive and other objectives - appears to be a crucial activity from the point of view of understanding what is involved in “the construction of a modern market system”.

Rather than intrinsic capabilities within the actors, various material, meteorological and procedural systems and devices give the actions of actors specific shape. For instance, an accounting system represents a powerful system with substantial effects – even on the shaping of objectives and preferences of individuals and on the allocation of institutional property and control rights. Not to mention the many governance systems and devices which can be constructed on the basis of such a thing as an accounting system. It takes the mobilization of substantial anti-acts from rival collectives to prevent these devices and governance systems from delivering substantial translations of actors.

The theory needed is one about entities which configures ontologies including agents. In the early work of Granovetter (1973), there are elements of a theory about entrepreneurial collectives; the network where what the actors are and do are all dependent on the character of their relations to other actors or other networks. They are networks with endogenous objectives, preferences and expectations. In his concept, one is also able to shift freely between actor and network and to account for variability and change, and to escape from the formative powers of the network itself. He does not follow these concepts through however, which appears to follow at least in part from an over-emphasize on whatever is of social or inter-personal character. In this respect, the actor-network analytical concepts expand and enrich Granovetter’s early work.

The theory of entrepreneurial collectives and the actor-network analytical concepts oppose the view that markets in their essence are embedded in social networks. It is not a question of adding social, interpersonal or informal relations to the concepts offered by economists in order to

understand the functioning of markets. Rather, an explanation necessitates a second order of observation level of analysis in which we take what economics does to the economy seriously, in which we focus on the functioning of markets as well as on what people do to perform the economy and its agents. In this perspective, the relevance of social relations in markets in part may be seen as historical “left-overs” from the market reconstruction processes guided by economics, or as effects of “spill-overs” which result from the impossibility of complete internalization of all relevant aspects of economic decision-making in markets – from the fact that economists are unlikely to be able to complete their work on separating, externalizing and re-internalizing elements which are continuously flowing into their ordered economic systems. Even the maintenance of the essential blackboxes which make up the core of their program – may turn out to be a difficult task in the longer run – as the complexities of things may produce capacities to break some of those blackboxes apart and to reshape the economy from the basis of a configuration of new and different blackboxes.

Institutional economics here associated with a tradition from Veblen to Bromley and Hodgson, is closer to taking the second order of observation position vis á vis economics. Bromley also emphasize the purpose of the future as the point of departure for a dynamic economic theory about how we came from here to there – how the “methods of doing things” have been improved (Bromley, 1998). Together with his work on the “ideological” character of economics in shaping economic systems and economic behaviors (Bromley, 1990), other elements of a theory about entrepreneurial collectives are already there – pointing at the same vital role of economics in the shaping of the economy. Much interesting work has obviously been done.

What appears to be needed to advance this line of theorizing, is a deep concern with the development of analytical concepts by which to operate the very challenging questions raised. In this respect, I believe that the actor-network concepts may serve as a useful contribution and as a point of departure which holds the potential for delivering much of the goods demanded, and on which basis additional analytical concepts may be constructed which are specifically shaped so as to address economic issues.

One also has to make clear that the actor-network story is not without its own primitive categories. These are the circulating phenomena we have denoted “collectives”, their human entrepreneurs, the collectives they shape and mobilize, the “collective things” which gives them their specific shapes

and powers, and the other circulating phenomena which act upon them, which enrolls them and modifies them¹⁸³.

The theory of entrepreneurial collectives in my view offers concepts needed to begin conceptualizing how actors construct their worlds as demanded by Fligstein and Mari-Drita, how they organize themselves for their provisioning, as visioned by Bromley (and Veblen). It offers the opportunity to model how different cultures rival with and interact with each other and how political programs, interests and powers interact with economic transformation projects, as demanded by Zelizer, Zukin and DiMaggio.

However, conceptual improvements should be put on the agenda in order to fit the network methodology to the specific needs of economic studies. In particular, I feel that there is a need for concepts of language which more adequately contrast established economic collectives with substantial locked-in powers within industries and economies with emerging entrepreneurial collectives. Those well established are not entrepreneurial in the common sense meaning of the term, and should be addressed by some adjective emphasizing relative stability and historical origins. Similarly, there is a need to better contrast human representatives from non-human representatives of a program – and in particular contrast those non-human elements which represent “semi-ontological” economic systems from elements which hold the more specialized roles within those systems.

Despite the obvious advantage of a both simple and completely general toolbox of analytical concepts, I also feel that we need concepts which represent the contrast between a “global” entrepreneurial collective like the new market program of the 1980s, the “local” collective associated with specific innovations, and the “intermediate” collectives associated with such phenomena as industrial transformations, that are both extended and multi-local.

It seems to me that the operational solution to these conceptual challenges may be to invent dual concepts in which some descriptive adjective is added to the actor-network term. Because this term is essentially dual already in order to represent both the actor and the network – the active and the passive - side of a phenomenon, this leads to *triple concepts*. Even though this

¹⁸³ An obvious link which I have not explored here, goes to the Schumpeter tradition within economic thought, in which the entrepreneur also makes up the basic category.

complicates the analytical concepts, there seems to be no other option if one is to address these differences with the needed accuracy.

Even though the actor-network concepts are flexible and may be applied to any phenomenon, they cannot be applied to “explain everything” – at least not in every relevant way, and do not represent any class of theory “above” other theories. Rather, its fruitfulness should be judged from its contributions to empirical studies and from the persuasiveness of the type of explanations it offers, just like any other social and economic theory. There is nowhere else from where we might settle the disputes between rival theories.

I also recognize that the “following the networks” research strategy which follows from the network theory, has its potential weaknesses. In particular it invites a tremendous amount of research activity where the researcher all the time has to judge the relevance of as well as the strength, the character and the role of particular relations – which in the absence of substantial empirical knowledge are often difficult to settle.

In the end, I feel that less time could have been spent on the complexities of historical events and the discussion of historical collectives, where as more efforts could have been devoted to investigate change processes from points of observation around the industry – to obtain specific local perspectives on the processes described as well as on their local reform processes. This would have provided a perhaps more balanced view on the role of economic scientists and state administrators as opposed to electricity company owners, managers and employees as well as other change agencies who entered the sector and played important roles in the transformation of the industry. This, however, will be left for later work – or for others to explore.

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